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WILDLIFE REVIEW

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UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

June 196

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WILDLIFE REVIEW

An abstracting service for wildlife management
Issued for the information of cooperators
by the Fish and Wildlife Service
United States Department of the Interior

June 1960 Patuxent Wildlife Research Center, Laurel, Maryland No. 98

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Except as indicated, abstracts are by Kenneth J. Chiavetta, editor.

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NATURAL RESOURCES & CLIMATE

National Park Service. A REPORT ON A SEASHORE RECREATION AREA SURVEY OF THE ATLANTIC AND GULF COASTS. Natl. Park Serv., USDI. iii + 246 p., illus. 1955.
From summ. Of the 3,700 miles of shoreline of the Atlantic and Gulf coasts, there are 240 miles or 6.5% in Federal or State ownership for public recreation purposes [2 national parks, 1 national seashore recreation area, 36 state seashores]. This survey identified and reported upon 126 undeveloped areas of which 54 are believed to be of interest to local, state or federal agencies as possible public seashores. All but 6 of these areas have been rated in the F&WS wetlands inventory as possessing high or moderate value for birdlife. It is recommended that one-half of the 640 miles of beach comprised in the 54 areas be acquired for public recreation purposes--raising the total for this purpose to 15% of the shoreline. A priority schedule for 16 of these areas is given. For most areas, the location, accessibility, description, present use and an evaluation analysis is given.

National Park Service. PACIFIC COAST RECREATION AREA SURVEY. Natl. Park Serv., USDI. iv + 219 p., illus. 1959.
From summ. Of the 1,448 miles of Pacific Ocean shoreline not in public ownership, 527 miles were identified as potential public recreation areas. These were divided among 74 individual areas. Seven of these areas with 190 miles of shoreline were considered of major importance for recreational, scientific or cultural purposes; 38 were classified as being of statewide importance; and 29 were adjudged to be of state, county or local significance. Twelve of the 74 areas (from the above categories) were found to warrant preservation from their biological values alone--primarily because of their waterfowl, shorebirds, marine birds or marine invertebrates. This report parallels that of the Atlantic and Gulf Survey above, and the individual areas are treated similarly.

Smith, Arthur D. (Utah State U., Logan.) WHOSE SPACE, AND FOR WHAT? Trans. 24th N. Am. Wildl. Conf. p. 449-456. 1959.
The increasing scarcity of land resulting from rapidly expanding population poses problems of land policy. Our traditional policies have been directed toward private ownership of land. As land becomes scarce, private ownership may not be well suited to securing maximum production from land since individuals may fail to consider all of the values inherent in land. Public ownership is one means of promoting maximum production from our land resources. Modifying land ownership to permit land occupancy only for specific purposes such as timber exploitation, mining, etc., may be necessary to achieve full production from land and insure that land use can be readily adjusted to meet changing needs.--From auth. abst.

SOILS

Carter, O. R., and others. SOIL SURVEY OF CHAMBERS COUNTY, ALABAMA. US Soil Cons. Serv., Ser. 1956, no. 3. ii + 53 p., 11 figs. + large single-fold maps based on aerial photos and bound in. June 1959. Sold by Supt. Documents.

Cummins, Joseph F., and others. SOIL SURVEY OF SCOTT COUNTY, MINNESOTA. US Soil Cons. Serv., Ser. 1955, no. 4. 1-93 p., 18 figs. + large single-fold maps based on aerial photos and bound in. Oct. 1959. Sold by Supt. Documents.

Fussell, K. E., and others. SOIL SURVEY OF MARSHALL COUNTY, ALABAMA. US Soil Cons. Serv., Ser. 1956, no. 2. ii + 61 p., 16 figs. + large single-fold maps based on aerial photos and bound in. June 1959. Sold by Supt. Documents.

Harmon, A. B., and others. SOIL SURVEY OF MAURY COUNTY, TENNESSEE. US Soil Cons. Serv., Ser. 1952, no. 7. ii + 94 p., 18 figs. + single-fold maps based on aerial photos and bound in. Oct. 1959. Sold by Supt. Documents.

McNutt, E. J., and others. SOIL SURVEY OF DE SOTO COUNTY, MISSISSIPPI. US Soil Cons. Serv., Ser. 1953, no. 6. ii + 62 p., 2 figs. + single-fold maps based on aerial photos and bound in. Sept. 1959. Sold by Supt. Documents.

SOILS--Continued

Morgan, C. G., and others. SOIL SURVEY OF QUITMAN COUNTY, MISSISSIPPI. US Soil Cons. Serv., Ser. 1947, no. 9. ii + 38 p., 8 figs. + single-fold maps based on aerial photos and bound in. Dec. 1958. Sold by Supt. Documents.

Shearin, Arthur E., and others. SOIL SURVEY OF ROCKINGHAM COUNTY, NEW HAMPSHIRE. US Soil Cons. Serv., Ser. 1954, no. 5. ii + 78 p., 6 figs. + colored single-fold maps bound in. Aug. 1959. Sold by Supt. Documents.

Sherard, Hoyt, and others. SOIL SURVEY OF LAWRENCE COUNTY, ALABAMA. US Soil Cons. Serv., Ser. 1949, no. 10. iii + 83 p., 9 figs. + single-fold maps based on aerial photos and bound in. Nov. 1959. Sold by Supt. Documents.

Wildermuth, Robert, and others. SOIL SURVEY OF SARASOTA COUNTY, FLORIDA. US Soil Cons. Serv., Ser. 1954, no. 6. ii + 71 p., 12 figs. + single-fold maps based on aerial photos and bound in. Nov. 1959. Sold by Supt. Documents.

Wilson, Le Moyne, and others. SOIL SURVEY OF ROOSEVELT-DUCHESNE AREA, UTAH. US Soil Cons. Serv., Ser. 1940, no. 24. iii + 61 p., 10 figs. + single-fold maps based on aerial photos and bound in. Dec. 1959. Sold by Supt. Documents.

Zayach, S. J., and others. SOIL SURVEY OF GRAND ISLE COUNTY, VERMONT. US Soil Cons. Serv., Ser. 1953, no. 8. ii + 49 p., 1 fig. + single-fold maps based on aerial photos and bound in. Dec. 1959. Sold by Supt. Documents.

CONSERVATION EDUCATION

Giles, Robert H., Jr. (RFD 1, Box 309-C, Covington, Va.) THE CONSERVATION KNOWLEDGE OF VIRGINIA SCHOOL PUPILS. Trans. 24th N. Am. Wildl. Conf. p. 488-499, 4 figs. 1959.

A valid, reliable, recognition type of objective test with 100 multiple response questions was prepared and administered to 15,443 Va. public school pupils in grades 6 through 12. The purpose of the testing was to determine pupils' knowledge of certain principles of natural resource conservation in general, soil, forest, water, and wildlife conservation, and the source of this knowledge. The average statewide score for all pupils in all areas was 54.8%. The greatest knowledge was shown in principles of general conservation, the least in principles of wildlife conservation. Farm children were found to be significantly lower in possession of knowledge than either urban or suburban pupils. Recommendations were presented.--From auth. abst.

Lauber, Patricia. OUR FRIEND THE FOREST / A CONSERVATION STORY. Doubleday & Co., Inc., Garden City, N. Y. 61 p., illus. 1959. $2.00.

The conservation story interestingly told for children. Authoritative and readable. In the first section, the question What makes a forest? is answered. Animals of the forest are introduced along with the idea of a forest community, and the food cycle is explained. This is all done in simple language. For example: "A forest is a community of plants and animals. They come in all sizes shapes and ages. All are part of the forest. All depend on one another for life. All are bound together in a circle of life. One very big part of the circle is food..." In the next section, tree growth and the varied means of seed dispersal are described. Another section tells of forest products, lumbering, recreation, soil and water conservation, and the beginning of forest conservation. Highlights of the forestry profession are indicated in the section entitled Man, the forest's friend which includes paragraphs on fire fighting, tree diseases, harmful insects, tree farming and modern conservation. To complement the text, black-and-white linecuts are found on almost every page.

Marckworth, Gordon D. (U. Wash., Seattle.) STATISTICS FROM SCHOOLS OF FORESTRY FOR 1959: DEGREES GRANTED AND ENROLLMENTS. J. For. 58(3): 188-194. Mar. 1960.

Includes 10 tables of statistics on degrees granted and enrollments at 42 U. S. forestry schools in 1958 and 1959. In 1959, there were 1,470 undergraduate degrees granted of which 144 (10%) were in wildlife management. Forty-one (17%) of the 241 M.S. degrees were in wildlife management and 8 of the 43 Ph.D. degrees granted were in wildlife management.

PLANTS--GENERAL, ECOLOGY, TECHNIQUES

Campbell, Robert S., and others. (S. For. Exp. Sta., New Orleans 13, La.) TECHNIQUES AND METHODS OF MEASURING UNDERSTORY VEGETATION / PROCEEDINGS OF A SYMPOSIUM AT TIFTON, GEORGIA, OCTOBER 1958. S. For. Exp. Sta. and SE. For. Exp. Sta., For. Serv., USDA. iii + 174 p., illus. 1959.

Includes 27 papers and committee reports of a conference organized into four major sections: (1) Measuring herbage production and utilization, (2) measuring plant cover and composition, (3) related forestry problems, and (4) statistical problems.

Coon, Nelson. (P. O. Box 994, Vineyard Haven, Mass.) USING WAYSIDE PLANTS. 3d edition. Hearthside Press, Inc., N. Y. 16. 254 p., 170 drawings + photos + 90 maps. Revised 1960. $3.95.

This book, formerly published by the author, is now made available to a wider public through the Hearthside Press. Twelve pages of photographs have been added, but the text has not been altered from the 2d edition which was reviewed in WR 91: 6 as follows: "An interesting book on past and present uses of common plants of the NE. The author hopes to awaken us to the pleasures and values that can be found along almost any country road, and to keep us from feeling that all good things come from the store. His book is reasonable in price and should go a long way toward serving the desired purpose. It has an index and a list of selected references. One chapter gives many unusual recipes for cooking wild plants or making beverages from them. Other chapters tell how to use plants for various craftwork, for amusement of children, for making dyes, for decoration indoors and out, and for medicines. These chapters offer many suggestions that would be worth following, if only for the fun of seeing how the old-timers did things. The author is fairly cautious about recommending herbal medicines, but may still be a bit too enthusiastic to please doctors. The second and greater part of the book takes up plants species by species, with pen and ink drawings and maps, and tells of the uses of each kind. Poisonous plants are the subject of the final chapter."

Edwards, Malcolm G. (P. O. Box 634, Gainesville, Georgia.) A TECHNIQUE FOR OBTAINING SAMPLES OF MAST. J. Wildl. Mgt. 24(1): 88. Jan. 1960.

By use of a series of short, joined aluminum poles terminating in a pruning device, branches for mast counts have been quickly obtained from trees up to 90' in height.--Auth. abst.

Haga, Toshiro, and Kaniro Maezawa. (Sanyo Pulp Co., Ltd., Tokyo.) BIAS DUE TO EDGE EFFECT IN USING THE BITTERLICH METHOD. For. Sci. 5(4): 370-376, 5 figs. 1959.

Mathematical paper. "Edge-effect bias should be considered when the land is small or the edge is long."

Hutchings, Selar S., and Ralph C. Holmgren. (Intermtn. For. & Range Exp. Sta., Ogden, Utah.) INTERPRETATION OF LOOP-FREQUENCY DATA AS A MEASURE OF PLANT COVER. Ecol. 40(4): 668-677, 6 figs. Oct. 1959.

From summ. The inherent positive bias of the loop-frequency index as an index of percent plant area depends on plot (loop) size, and on number and size of plants. Equations for conversion of loop indices to percent plant area are given. The influence of plant distribution pattern on the bias is shown, and a way to eliminate this effect is suggested. Possible modifications for reducing the inherent bias of the loop-frequency method are discussed.

Long, G. DESCRIPTION D'UNE MÉTHODE LINÉAIRE POUR L'ÉTUDE DE L'ÉVOLUTION DE LA VÉGÉTATION. (EN USAGE AU SERVICE DE LA CARTE DES GROUPEMENT VÉGÉTAUX). [DESCRIPTION OF A LINEAR METHOD FOR THE STUDY OF THE EVOLUTION OF VEGETATION. (USED BY THE DEPARTMENT OF MAPPING VEGETATION GROUPINGS.] Bul. Serv. Carte Phytogeog. Ser. B. 3(2): 107-126, illus. 1958. [From Biol. Abst. 35(5).]

[In French.] A method is presented which is a modification of that of Parker and the author's own "3-step method." The equipment, proper setting of the lines, execution of observations, and use of an appropriate formulary are described.--From abst. by MDS.

Moore, Alma Chestnut. (Hartsdale, N. Y.) THE GRASSES / EARTH'S GREEN WEALTH. Macmillan Co., N. Y. 11. ix + 150 p., illus. 1960. $5.00.
This informative book deals with the entire grass family with emphasis on the grains which are the basis of our starchy foods, and those grasses which are important in the production of meat and dairy products. Much material of general interest is packed in the accounts of the various grains, sugar cane, and bamboo. Wildlife utilization of the cereals is not mentioned--except for a brief sentence in the account of wild rice. Conservationists will find chapter 3 entitled "Land Building" and chapter 14 entitled "Grasses to the Rescue" absorbingly interesting. In "Land Building" the importance of Spartina in the conversion of mud flats to meadowlands, and of Ammophila in dune stabilization are stressed. The soil conservation program--from ancient times to the present--is outlined in chapter 14.

Sudia, Theodore William. A COMPARISON OF FOREST ECOLOGICAL SAMPLING TECHNIQUES WITH THE USE OF A KNOWN POPULATION. Ph.D. thesis, Ohio State U. 39 p. 1954. [From long abst. in Dissertation Abst. 20(7), 1960.]
An 11-acre sample of a 60-acre Swamp Forest community was surveyed and every tree 4 or more inches d.b.h. was mapped. The map population was sampled by the following methods: 1) plotless variable radius; 2) random pairs; 3) the 4-yard quadrat; 4) the 10-yard quadrat; and 5) 4 transects, 2 of which crossed the width, and 2 of which crossed the length of the area. Each sampling method was used to estimate basal area per acre and stems per acre of the total population of 4 dominant tree species. Statistics (t-test) was used to compare (1) each method as a whole and (2) each item of the individual sampling method. For (1), random pairs sampling was the only method which yielded a t less than that of the 5% level of significance for both basal area per acre and stems per acre. The 4-yard quadrat was the least efficient, with the others falling in between. Itemwise, (2), the estimates of basal area per acre rated as follows: 1) random pairs, 2) 10-yard quadrat, 3) plotless variable radius method and transect 8 x 304 yards, 4) transect 4 x 95 yards, 5) 4-yard quadrat and transect 4 x 95 yards. Stems per acre ratings were: 1) random pairs, 2) transect 8 x 304 yards, 3) transect 4 x 95 yards, 4) transect 4 x 278 yards, 5) transect 8 x 120 yards and plotless variable radius method, 6) 4-yard and 10-yard quadrats. Since on other studies (on spruce-fir communities of Tenn.) the plotless variable radius proved superior to the random pairs method, an inference is made that sampling methods devised in one particular type of forest community may not yield valid information in another.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY

Buell, Murray F., and Vera Facey. (Rutgers State U., New Brunswick, N. J.) FOREST-PRAIRIE TRANSITION WEST OF ITASCA PARK, MINNESOTA. Bul. Torrey Bot. Club 87(1): 46-58, illus. Jan. 1960.
The transition is rather abrupt. The distribution of its plant communities is related to differences in topography and soil texture. Woodland has increased in the last half century. Pronounced changes in vegetation have been caused by drainage and by decrease in fire.--Neil Hotchkiss.

Daily, Fay Kenoyer, and Walter Kiener. (Butler U., Indianapolis 7, Ind.) THE CHARACEAE OF NEBRASKA--ADDITIONS AND CHANGES. Butler U. Bot. Studies 13 (1): 36-46, illus. Dec. 1956.
There is a key to the Characeae of the State: 12 species of Chara, 7 of Nitella, 3 of Tolypella. For each species there are references to descriptions and illustrations and a list of localities. There are drawings of Nitella oligospira and Chara hirsuta. The authors have studied collections from about half of the counties. The lakes and marshes of the sandhill region have not yet been explored. [See WR 53: 37 and WR 76: 86 for listings of earlier papers.]--Neil Hotchkiss.

Egler, Frank E. (Aton Forest, Norfolk, Conn.) A CARTOGRAPHIC GUIDE TO SELECTED REGIONAL VEGETATION LITERATURE / WHERE PLANT COMMUNITIES HAVE BEEN DESCRIBED. PART I. NORTHEASTERN UNITED STATES. Sarracenia 1: 1-50, 9 figs., polycopied. Aug. 1959.

"This bibliography covers the literature on 'vegetation' as distinct from that on 'flora.' The annotations in every case have been phrased for those interested in vegetation science, even though the paper by major content and intent deals with a related field." It "is organized...by geographical localities arranged alphabetically and...by chronology to reveal the historical development of our knowledge of the area. The bibliography is limited to terrestrial vegetation...state and local floras are not included, since they are adequately covered in other bibliographies. The literature is included through that of 1958."

Fell, Egbert W. THE GENUS CAREX IN ROCK RIVER VALLEY IN NORTHERN ILLINOIS. Nat. Land Inst., 303 Penfield Pl., Rockford, Ill. 52 p., illus. 1959.

Contains a key and figures of 95 spp. of Carex. Many of these are of value to wildlife. Annotated list includes information on vegetative characters, distribution, relative abundance and preferred habitats.

Hanson, Herbert C., and Eilif Dahl. (Catholic U. Am., Wash., D. C.) SOME GRASSLAND COMMUNITIES IN THE MOUNTAIN-FRONT ZONE IN NORTHERN COLORADO. Vegetatio 7(4): 249-270, illus. 1957.

Describes 4 associations and relates them to physical character of the soils. --Neil Hotchkiss.

Honczarenko, G. VEGETATION OF THE MEADOWS IN ZEMBORZYCE IN 1926 - 1953. An. UMCS (Lublin), Sect. E. 10(11): 323-355. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]

In Polish with Russian and English summ. Representing the species composition, their numbers and special pattern of meadows and reproducing vegetation changes which occurred on investigated territory during 27 years.

Mohlenbrock, Robert H. (S. Ill. U., Carbondale.) PLANT COMMUNITIES IN JACKSON COUNTY, ILLINOIS. Bul. Torrey Bot. Club 86(2): 109-119, illus. March 1959.

Describes 3 series of communities. The river series comprises floodplain, river bluff, and ravine. The pond-swamp series comprises lakes and ponds, marsh, swampy forest, and prairie. The upland series comprises rock hill slopes and exposed rock hills.--Neil Hotchkiss.

Munz, Philip A., and David D. Keck. A CALIFORNIA FLORA. U. Calif. Press (Berkeley). 1681 p., illus. 1959. $11.50. [From Biol. Abst. 35(1).]

A comprehensive manual of the flora of Calif. covering native and naturalized plants. The volume is broad in content and uses a new system of grouping species according to plant communities, not according to family order. Species' descriptions, morphology, chromosome numbers, habitats, plant communities, altitudinal and geographic distribution, and flowering dates are given. The introduction contains sections on California's size and topography, its climate, geological history, recent geological history and vegetation written by Daniel I. Axelrod, and California plant communities. The volume will be valuable for use as reference and as a textbook for courses including taxonomy, systematic botany and ecology. A 15-page glossary of terms is included.--From abst. by E. Zipf.

Phipps, Richard, and John Speer. (E. Ill. U., Charleston.) A HILLSIDE MARSH IN EAST-CENTRAL ILLINOIS. Trans. Ill. State Acad. Sci. 51(3-4): 37-42, 1 fig. 1958 (1959).

An intensive study of a small marsh in Coles County. A total of 111 species of 86 genera is listed with 26 new records for the county. An ecological description of the area is included.--Kenneth L. Williams.

Robinson, Albert, Jr. (Kans. Wesleyan U., Salina.) THE FLORA OF IZARD COUNTY. Proc. Ark. Acad. Sci. 13: 9-14. 1959.

A cataloging of woody plants representing typical Ozark flora. Eighty-eight plants are listed with geographic reference, and by genera, to site.--Wm. J. Allen.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY--Continued

Sławiński, W. THE OUTLINE OF THE THEORY OF VEGETATION OF MEADOWS. Roczniki Nauk Rolniczych (Warsaw), Ser. F. 71(4): 823-882, 2 figs. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]
In Polish with Russian and English summ.

Small, John A., and William E. Martin. (Rutgers State U., New Brunswick, N. J.) A PARTIALLY ANNOTATED CATALOG OF VASCULAR PLANTS REPORTED FROM ISLAND BEACH STATE PARK, NEW JERSEY. Bul. Torrey Bot. Club 85(5): 368-377. Sept. 1958.

Van Vechten, George W. III, and Murray F. Buell. (Rutgers State U., New Brunswick, N. J.) THE FLOOD PLAIN VEGETATION OF THE MILLSTONE RIVER, NEW JERSEY. Bul. Torrey Bot. Club 86(4): 219-227, illus. July 1959.
Has been intensively farmed, and 33% still is being farmed. 14% was recently abandoned, 49% is woodland, 4% is marsh. Natural revegetation of abandoned farmland is rapid; but in some places rank perennial herbs keep woody plants from becoming established for a long time.--Neil Hotchkiss.

PLANTS--FOREST SURVEYS

Sheldon, William G. (U. Mass., Amherst.) COVER MAPPING A FIVE-MILLION ACRE STATE FROM AERIAL PHOTOGRAPHS. Trans. 24th N. Am. Wildl. Conf. p. 313-321. 1959.
A method is described of completely cover-mapping a state from aerial photographs. The forests were typed according to species, height and density. Open and wet lands were typed in twelve different categories. Cover types were transposed to U. S. Geological Survey maps. Finished maps included vegetative planimetric and topographic details. Complete tabulations of all types were made for each township in state. The maps have proved useful to game managers for evaluating game cover for different species, selecting areas for stocking, finding small wetlands for developing waterfowl areas, and setting up census lines. Countless man hours of field work are saved. Cost of project exclusive of photography was about 1/2¢ per acre.--From auth. abst.

WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY

Dementiev, G. P. (U. Moscow.) LA FAUNE DESERTIQUE DU TURKESTAN. [THE DESERT FAUNA OF TURKESTAN.] La Terre et la Vie (Paris) 105(1): 3-44. 1958.
In French. Article considers only the warm deserts in the plain, which are divisible into two zones: (1) a southern type desert in the east of Turkestan, characterized by halophytes and a rich ephemeral flora; and (2) a northern type desert in the west of Turkestan, characterized by Artemisia and having few ephemeral plants. Coloration of vertebrate animals is considered at length. The pigmentation of cold-blooded vertebrates is produced in a period when the processes of oxidation are particularly low. Desert coloration is thus a secondary phenomenon, which in some cases is of protective or cryptic value. Species of vertebrates are listed with brief comments. Fifty species of mammals, excluding bats, are characteristic of these deserts; 43% of these species are also found in the steppes and pseudo-steppes. Of 300 species of birds, only 70 are typical of deserts, 28 of these form the nucleus of the desert avifauna; 60% of these 28 species are resident. The other 230 species are found in riparian and irrigated regions. There are 12 spp. of snakes, 23 of lizards, and 3 of anurans. A historical sketch of biological research in Turkestan is given, with a selected bibliography of 191 articles.--From abst. by R. M. Chew.

Goos, A. METHODS AND ORGANISATION OF PROTECTION OF VEGETATION. PWN (Wrocław). 96 p., 44 figs. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]
In Polish. In the chapter "Biological method," the author analyses generally the laws directing the coexistence of vegetation and animal communities and gives examples illustrating the relations existing in biocenoses and populations.

Leopold, A. Starker. WILDLIFE IN MEXICO / THE GAME BIRDS AND MAMMALS. Illustrated by Charles W. Schwartz. U. Calif. Press (Berkeley and Los Angeles). xiii + 568 p., 194 figs. 1959. $12.50.

In the forward, Enrique Beltrán sums up this authoritative well-illustrated book with "To say that the present book is the 'best' in its class is an understatement. Indeed, it is the 'first' in which the author has been able to combine an adequate biological background with thorough, firsthand investigation of wildlife problems as they exist in the field. In effect, this volume fills a real vacuum that has existed in the literature on Mexican wildlife." The physiographic regions, rainfall distribution, native vegetation, the existing wildlife conservation program, and recommendations for a future well-rounded wildlife program are outlined in approximately 100 pages (Part I). Then follows accounts of more than 150 species of game birds (Part II) and game and fur-bearing mammals (Part III). One is reminded that wildlife resources have been depleted more as the result of bad practices in land use than through over-harvesting. Recreational hunting is encouraged--while commercial hunting is not. "The greatest social value and cash value of wildlife lies in its recreational potential, not in the meat or salable products." "The use of wildlife for food [however]...need not be discouraged except as it is excessive and is destroying the resources (ungulates, for example) or as it interferes with the building up of recreational hunting, the higher economic form of use." A basic land conservation program is recommended which would use wildlife crops in "ways to best serve the people of Mexico"--via regulation of harvest, habitat conservation and improvement, education, and a system of parks and natural reserves. The bulk of the book deals with Mexican wildlife. Under each account are found: 1) criteria for species identification with drawings by Schwartz (and often complemented by excellent photos); 2) a range map; 3) natural history information; and 4) a report on the present status of the species and its management. Since by local interpretation anything that moves is "game," Leopold pragmatically uses the species listed in the 1954 version of the Mexican game law as a basis for inclusion in the book--omitting parrots and bats. Taxonomists may object to group entries of closely allied forms--an expedient used in an effort to avoid duplication in life history accounts. Hunters and many naturalists, however, will rejoice to find that there is no mention of subspecies or geographic races.

Macpherson, A. H., and T. H. Manning. (Can. Wildl. Serv., Ottawa.) THE BIRDS AND MAMMALS OF ADELAIDE PENINSULA, N. W. T. Natl. Mus. Can., Bul. no. 161. iv + 63 p., 1 fig., 6 pls. 1959. $1.50.

An account of bird and mammal fauna of Adelaide Peninsula based upon a collection of 700 birds of 38 spp. and about 560 mammals of 8 spp. "These are identified in this report, and field data relative to the status and abundance of each species are summarized... Observation on the birds and mammals by previous expeditions to Adelaide Peninsula are included... The lists are supplemented...by summaries of our observations on topography, weather and ice."

St. Amant, Lyle S. (La. Wild Life & Fisheries Comm., New Orleans.) LOUISIANA WILDLIFE INVENTORY AND MANAGEMENT PLAN. La. Wild Life & Fisheries Comm. xx + 329 p., 32 figs. + 23 pls. 1959.

Based upon PR field studies carried on in 1946-50. The delay in publication is indeed unfortunate. Introductory sections describe techniques used, physiography, geology, climate and the ecological divisions of La. In the species accounts range, food conditions, population density, distribution, limiting factors, harvest information, potential, and management recommendations are described for each of the seven ecological divisions of La.

Strawiński, St. FAUNA OF VERTEBRATES IN THE YEW RESERVATION OF WIERZCHLAS. Zeszyty Naukowe Umk (Toruń), Biol. 1: 105-148, 2 maps. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]

In Polish with Russian and English summ.

WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY--Continued

Wright, J. T. (Ariz. Game & Fish Comm., Phoenix.) DESERT WILDLIFE / A RESEARCH STUDY. Ariz. Game & Fish Dept., Wildl. Bul. no. 6. iii + 78 p., 10 figs. + large folded map bound in. Aug. 1959.

A detailed study of the topography, history, climate, flora and fauna of w.-cent. and sw. Ariz. There is a chapter on water development in wildlife habitat improvement which describes and evaluates rainwater catchments, wells and windmills, earth reservoirs, retention dams, and natural tanks.

WILDLIFE--NATURE PROTECTION & RARE & EXTINCT SPECIES

Pfeffer, Pierre. SITUATION ACTUELLE DE QUELQUES ANIMAUX MENACÉS D'INDONÉSIE. [ACTUAL SITUATION OF SEVERAL MENACED ANIMALS OF INDONESIA.] La Terre et la Vie (Paris) 105(2): 128-145, illus. 1958.

In French. Discusses the status of the following threatened species: Javanese rhinoceros (Rhinoceros sondaicus), Sumatran rhinoceros (R. sumatranus), orang-outan, proboscis monkey (Nasalis larvatus), Komodo dragon (Varanus komodoensis), langur (Presbytis hosei) and porcupine (Hystrix sp.).--From abst. by R. M. Chew.

Simon, Noel, and George Treichel. (Kenya Wild Life Soc., Nairobi.) WILDLIFE CHALLENGES IN EAST AFRICA. Trans. 24th N. Am. Wildl. Conf. p. 465-472. 1959.

"In summary, the present wildlife situation in British East Africa is critical and unless adequate measures are taken as a matter of urgency, another decade or two may well see the total elimination of wildlife in this part of the world except for scattered remnants in a few isolated token regions. In many parts of Africa, the effort to conserve wildlife has come too late. In 10 years time, it may be too late for East Africa. Wildlife management on a scientific basis is required as a matter of urgency."

WILDLIFE--EFFECTS OF CHEMICALS, WEATHER, CARS, ETC.

Chisholm, Robert D., and Louis Koblitsky. (USDA, P. O. Box 150, Moorestown, N. J.) ACCUMULATION AND DISSIPATION OF PESTICIDE RESIDUES IN SOIL. Trans. 24th N. Am. Wildl. Conf. p. 118-123. 1959.

The quantity of a chlorinated hydrocarbon deposited on the ground from spraying or dusting crops is limited by type of formulation, method, rate and frequency of application; and density of foliage. Depth of distribution in soil is limited largely by depth of cultivation. Volatilization and erosion, are the main causes of dissipation of chlorinated hydrocarbons from soil. The accumulation of chlorinated hydrocarbons in soil is highly variable among crops on which they are applied. It has been reported that aldrin, chlordane, heptachlor, and lindane are much less persistent than DDT, dieldrin, and toxaphene. Since residue concentrations in soils are at low levels, large amounts of contaminated soil would have to be eroded to produce appreciable concentrations of insecticides in streams.--From authors' abst.

Decker, George C. (Ill. Nat. Hist. Surv., Urbana.) INSECTICIDES IN THE 20TH CENTURY ENVIRONMENT. AIBS Bul. 10(2): 27-31. Apr. 1960.

A condensation of a review paper which was presented at an ecological problems of pest insects symposium sponsored by the Ecological Society of America in 1958. Major conclusions: "The future food, fiber, and public health needs of this country will assure the continued...[or] greatly expanded use of insecticides for generations to come. Favorable results notwithstanding, the many diverse and complex problems of wildlife conservation in a chemical world must be kept under continued surveillance. Since most of the unfortunate incidents, problems, and differences of opinion that have arisen or are likely to arise, involve insecticidal usage...that was not covered by label approval it appears that the solution of the problem...[is] the detection, isolation, proper evaluation, and eventual elimination of malpractices rather than indulgence in wholesale condemnation of insecticides and insecticidal usage per se."

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DeWitt, James B., and John L. George. (Patuxent Wildl. Res. Cent., Laurel, Md.) BUREAU OF SPORT FISHERIES AND WILDLIFE / PESTICIDE-WILDLIFE REVIEW, 1959. US F&WS, Cir. 84. iv + 36 p. Jan. 1960.

Research findings of the Bureau of Sport Fisheries and Wildlife, State agencies and independent research workers in Ala., Ark., Fla., Ga., La., Mass., Mich., Mont., N. Dak., Tex., and Wis. are summarized in this report together with recommendations for reducing damage from pest control operations. Major topics discussed are: Scope of Pesticide-Wildlife Problem; Effects on Wildlife--General; Laboratory Studies and Toxicology; Direct and Indirect Effects of Pesticides on Wildlife; Recent Pesticide Legislation; Value of Wildlife; and Recommendations for Safeguarding Wildlife Values during Pest Control. To avoid undue hazards to wildlife, applications must not exceed the toxicity equivalent of the following concentrations of DDT to the respective forms of wildlife: 0.1 pounds of DDT/acre for crustaceans; 0.2 for fish; 1.0 for amphibians; 2.0 for reptiles and birds; and 5.0 for most mammals. Other suggestions are: 1) Chemical treatment should be used only when entomological research has proved it to be necessary; 2) Before pesticides are used, the effects on different kinds of animals and on animals living in different habitats should be known and carefully considered; 3) Only minimum quantities of chemicals necessary to achieve adequate control of pests should be applied; 4) Pesticides should not be applied to areas that are any larger than is necessary and the chemicals that are used should be the ones whose effects are no more long-lasting than necessary; 5) Whenever possible, chemicals should be applied at the seasons of the year when wildlife damage will be least; 6) Conscientious effort should be made to be sure that pesticides are applied at no more than the intended rates and that no areas receive double doses. Alternates to chemical control are suggested. Among these are biological control, modified agricultural practices, destruction of insect wintering quarters, and the manipulation of water levels.

Dustman, Eugene E. (US F&WS, Wash., D. C.) MAN'S CHEMICALS AND NATURAL RESOURCES. Cons. Volunteer 23(133): 52-56. Jan.-Feb. 1960.

A condensation of a cogent review paper on biocides and their effects on wildlife. The original paper was presented at the Midwest Wildlife Conference in Dec. 1959. Emphasis on insecticides.

Gannon, Norman, and G. C. Decker. (Ill. Nat. Hist. Surv., Urbana.) INSECTICIDE RESIDUES AS HAZARDS TO WARM-BLOODED ANIMALS. Trans. 24th N. Am. Wildl. Conf. p. 124-132. 1959.

A summarization of the work done by the authors and many others is presented in an attempt to place the hazards which pesticides impose on wildlife in their proper perspective. Considering the thousands of tons of pesticides which have been used and misused in the last 50 years, the impact of this usage on wildlife has been insignificant when compared with many of the other everyday acts of man and constitutes no cause for alarm. Alarmist individuals and groups simply make the task more difficult for competent and sincere workers in both the wildlife and pesticide fields to achieve the degree of cooperation necessary to solve their mutual problems.--From abst. by Norman Gannon.

Graham, Jay E., and Russell D. Anderson. THE EFFECTS OF MOSQUITO LARVICIDING ON OTHER ORGANISMS IN SALT LAKE COUNTY. Utah Acad. Proc. 35: 43-48. 1958.

Chemical agents for the destruction of mosquito larvae have been applied for 30 years in parts of Salt Lake County. The effects of DDT, heptachlor, malathion, and parathion applied at 0.3, 0.1, 0.5 and 0.05 pounds per acre respectively are studied. No effects (direct or indirect) were noted in mammals, birds and reptiles from the application of the above insecticides at the specified concentrations; but about one-half of the frogs were killed "where parathion was applied at several times the normal rate." Includes literature review and 21 references.

Hartenstein, Roy C. THE EFFECTS OF DDT AND MALATHION UPON SOIL MICRO-ARTHROPODS. Ph.D. thesis, Syracuse U. 115 p., 23 figs. 1959.

The effects of DDT and malathion upon soil microarthropods were studied. Six treatments were applied to 24 plots in each of 2 habitats, a mixed hardwood stand and a red pine plantation. A substantial reduction of the microarthropod population occurred in the plots treated with 50 lb./acre of DDT in the red pine plantation. In the mixed hardwood stand, the microarthropod population increased rapidly in the plots treated with 10 and 50 lb./acre of DDT and reached a peak 14 weeks after treatment. Thereafter these populations "crashed." Two lb./acre of malathions, 1 lb./acre of DDT, and a diluent treatment had no noticeable effect in both stands.--From abst.

Hunt, Eldridge G., and Arthur I. Bischoff. (Calif. Dept. Fish & Game, Sacramento.) INIMICAL EFFECTS ON WILDLIFE OF PERIODIC DDD APPLICATIONS TO CLEAR LAKE. Calif. Fish & Game 46(1): 91-106, 2 figs. Jan. 1960.

Effects of the gnat control program on wildlife at Clear Lake were studied beginning March 1958. All fish, bird and frog samples analyzed contained DDD in excess of the specified rate of dilution of active insecticide in the lake water on a p.p.m. basis. On circumstantial evidence, it was concluded that grebe losses occurring after DDD applications were caused by chronic DDD poisoning and that the nesting population of grebes has declined as a result of the DDD treatment of the lake.

Leedy, Daniel L. (US F&WS, Wash. 25, D. C.) PESTICIDE-WILDLIFE PROBLEMS AND RESEARCH NEEDS. Trans. 24th N. Am. Wildl. Conf. p. 150-165. 1959.

Findings from previous pesticide-wildlife research are briefly reviewed, guidelines for minimizing losses are outlined and the major problem areas are listed. Among the research needs are: (1) development of methods and conduct of studies to determine acute and chronic toxicities, mode of entry, and sublethal effects of pesticides on animals of various kinds and ages; (2) development of methods for determining and confirming the presence of lethal quantities of pesticides in animals suspected of having died as a result of chemical pesticide applications; (3) compilation of information on pesticide types, production, application methods, dosage rates and areas where pesticides are used; and (4) appraisal, in the field, of immediate and long-range, direct and indirect effects of pesticide operations on fish and wildlife. Study areas should be of sufficient size and number to be representative of treated areas. Eight major types of field projects are suggested for investigation.--From auth. abst.

McIntosh, I. G., E. L. J. Staples, and L. G. Morris. (Wallaceville Anim. Res. Sta., Dept. Agr., Wellington, N. Z.) THE TOXICITY OF MUSCLE, LIVER, AND HEART OF DEER POISONED WITH SODIUM MONOFLUOROACETATE (1080). N. Z. J. Sci. 2(3): 370-378. Sept. 1959.

Summary: "Meat, hearts and livers from 8 deer poisoned with 1080 in a field experiment have been examined for poison content and assessments made of the potential toxicity of these tissues for man. The most toxic meat produced contained 0.92 mg. of 1080 per 100 g. It is concluded that acute poisoning in a man eating tissues from a deer poisoned with 1080 and shot before symptoms of poisoning appeared could not occur, and that chronic poisoning from daily ingestion of the tissues would be most unlikely."

Mörzer Bruijns, M. F. (R.I.V.O.N., Bilthoven, Netherlands.) FAUNASTERFTE DOOR HET VERKEER. [WILDLIFE LOSSES FROM TRAFFIC.] De Levende Natuur 62: 73-77, 1 fig. 1959.

In Dutch. Monthly totals (for a 21-month period) of highway mortalities of birds, mammals and amphibians which were tallied during daily (10 km.) commuting. Checklist of 25 spp. of birds, 18 spp. of mammals and 2 spp. of amphibians.

Scott, Thomas G., Yuell L. Willis, and Jack A. Ellis. (Ill. Nat. Hist. Surv., Urbana.) SOME EFFECTS OF A FIELD APPLICATION OF DIELDRIN ON WILDLIFE. J. Wildl. Mgt. 23(4): 409-427, 1 fig. Oct. 1959.

A field application of dieldrin (3 lb./A.) was investigated for its effect on wildlife. Severe losses occurred among wildlife populations despite supervision of the program by professional pest control personnel. Most losses occurred during the week following application. Meadowlarks, robins, brown thrashers, starlings, common grackles, and ring-necked pheasants resident on the area at the time of application were virtually eliminated. Horned lark populations appeared to have taken heavy losses. Bird populations remained depressed in the treated area throughout the spring and early summer. It was attributed to a food shortage in the form of a markedly reduced insect population. Ground squirrels, muskrats, and rabbits were virtually eliminated, and short-tailed shrews, fox squirrels, woodchucks, and meadow mice appeared to have taken heavy losses. White-footed mice, house sparrows, and mourning doves seemed to exhibit a relatively high resistance to dieldrin poisoning. Wildlife populations appeared to have recovered or to have been well on the way towards recovery by the following year. Recommendations designed to minimize wildlife losses from dieldrin poisoning were suggested.--From abst. by T. G. Scott.

Trainer, D. O., and Lars Karstad. (Wis. Cons. Dept., Madison.) SALT POISONING IN WISCONSIN WILDLIFE. J. Am. Vet. Med. Assn. 136(1): 14-17, 2 figs. Jan. 1, 1960.

From summ. Salt (NaCl) poisoning was diagnosed in Wis. in wild rabbits, pheasants, quail and a pigeon during the winter 1958-9. Affected animals showed signs of severe derangement of the central nervous system. Salt poisoning was also produced experimentally by feeding NaCl to wild rabbits and pheasants. Salt spread on highways to control slippery road conditions was the agent in the naturally occurring disease.

WILDLIFE--PARASITES & DISEASES

Bouvier, G., H. Burgisser, and P.-A. Schneider. (Inst. Galli-Valerio, Lausanne, Switzerland.) OBSERVATIONS SUR LES MALADIES DU GIBIER, DES OISEAUX ET DES POISSONS FAITES EN 1957 ET EN 1958. [OBSERVATIONS ON DISEASES OF GAME ANIMALS, BIRDS AND FISH MADE IN 1957 AND 1958.] Schweiz. Arch. Tierheilk. 101 (7): 340-349, illus. 1959. [From Biol. Abst. 35(3).]

Karstad, Lars, Srikrishna Vadlamudi, R. P. Hanson, D. O. Trainer, Jr., and V. H. Lee. (U. Wis., Madison.) EASTERN EQUINE ENCEPHALITIS STUDIES IN WISCONSIN. J. Infectious Dis. 106(1): 53-59, 1 fig. Jan.-Feb. 1960.

A high percentage (61%) of rodents (fox and gray squirrels, ground squirrels and woodchucks) were found to have antibodies against eastern equine encephalitis virus. Of 45 pheasant winter road kills, 51% contained virus neutralizing antibodies. Similarly 26 of 52 ruffed grouse, 4 of 10 quail, 1 of 7 sharp-tailed grouse, and 1 of 3 black duck contained these antibodies. Six species of song birds also contained virus neutralizing antibodies. Attempts to isolate virus from bloodsucking diptera were unsuccessful. It is believed that eastern equine encephalitis is enzootic in Wis.

Keulen, A. Van. SALMONELLOSIS AS A ZOONOSIS. Tijdschr. v. Diergeneesk. 84 (19): 1102-1117. Oct. 1, 1959. [From Bibliog. Agr. 24(1), 1960.]

In Dutch with English summ.

Lloyd, H. E. D. ARTERIOSCLEROSIS IN CERTAIN WILD ANIMALS DYING IN CAPTIVITY. J. Compar. Path. 69: 98-104. 1959.

Aortic disease in 5 mammals and 31 birds is described. Mucoid changes were similar to those found in humans.--David O'Meara.

WILDLIFE--PARASITES & DISEASES--Continued

Steele, James H. (Communicable Dis. Cent., Chamblee, Ga.) EPIDEMIOLOGY OF LEPTOSPIROSIS. J. Am. Vet. Med. Assn. 136(6): 247-252. Mar. 15, 1960.
Important review paper with 64 references. "The wide distribution of leptospires in the wild animal populations throughout the world presents a real problem in our efforts to control the disease in both man and domestic animals. Therefore, in spite of somewhat encouraging results with vaccines, leptospirosis may be expected to occur for many years to come."

Thomas, Leo A., and James V. Smith. (Natl. Inst. Health, Hamilton, Mont.) THE 1958 ENCEPHALITIS OUTBREAK IN NORTHERN UTAH. 2. INFECTION RATES IN BIRDS, MAMMALS, AND MOSQUITOES. Mosquito News 19(4): 223-226, 1 fig. Dec. 1959.
Deals primarily with human, horse and chicken sera. "Sera from one meadowlark and one sparrow...and from 25 English sparrows...were tested for neutralizing antibodies with negative results."

WHO-FAO. JOINT WHO-FAO EXPERT COMMITTEE ON ZOONOSES--2ND REPORT. No. 169. Columbia U. Press. 82 p. 1959. Price 60¢.
Some new host species listed. Psittacosis now naturally infecting around 100 spp. of birds. Q-fever now known in 50 countries, spread by ticks and/or respiratory route. Also sections on hydatidosis, salmonellosis, toxoplasmosis and listeriosis.--David O'Meara.

WILDLIFE--POPULATIONS & FLUCTUATIONS

Diem, Kenneth L. (U. Wyo., Laramie.) SOME ASPECTS OF WILDLIFE POPULATION DYNAMICS, THEIR INTERPRETATION AND ROLE IN GAME MANAGEMENT. Trans. 24th N. Am. Wildl. Conf. p. 304-312. 1959.
Game managers have at times overlooked or avoided untangling the ecological implications of wildlife population fluctuations in favor of "shotgun" management measures. Population fluctuations of waterfowl, deer (North Kaibab, N. Y., Pa.), antelope (Wyo.), and squirrels (W. Va.) are discussed. The need for more knowledge of the influence of climate, topography, soil, water, vegetation, and land use by other animals and man is emphasized.--Auth.

WILDLIFE--BIOMETRICS

Andersen, F. Søgaard. (Statens Skadedyrlaboratorium, Springforbi, Denmark.) COMPETITION IN POPULATIONS CONSISTING OF ONE AGE GROUP. Biometrics 16(1): 19-27. Mar. 1960.
Mathematical models and descriptions of competition in populations consisting of a single age group are discussed.--V. Schultz.

Blackith, R. E. (Imperial Coll. Field Sta., Sunninghill, Berks, Eng.) A SYNTHESIS OF MULTIVARIATE TECHNIQUES TO DISTINGUISH PATTERNS OF GROWTH IN GRASSHOPPERS. Biometrics 16(1): 28-40. Mar. 1960.--V. Schultz.

Cormack, R. M. (U. Aberdeen, Aberdeen, Scotland.) 146 QUERY: PARTITIONING THE "BETWEEN SLOPES" SUM OF SQUARE FOR FOREST GROWTH DATA. Biometrics 16(1): 121-124. Mar. 1960.
Problem is constructing orthogonal components for unequally weighted data.--V. Schultz.

Darroch, J. N. (Statis. Lab., U. Manchester.) THE MULTIPLE-RECAPTURE CENSUS. II. ESTIMATION WHEN THERE IS IMMIGRATION OR DEATH. Biometrika 46(3/4): 336-351. Dec. 1959.
Previous paper [WR 94: 16] on multiple-recapture census when population is closed both from augmentation from outside and departure from inside. This paper removes these restrictions. "The main aims of this paper, as of (I), are to provide exact, fully stochastic models for the observed frequencies of individuals, to show how simply these frequencies naturally group themselves, and to obtain estimates of the unknown parameters. When there is immigration only or death only, the estimates are shown to be asymptotically efficient and their variances are found... When both immigration and death are operating... the complexity of the probability density prevents us from going further than

obtaining the estimates and merely indicating how their variances can be found. Both in (I) and in the present work we have been unable to obtain satisfactory tests of the underlying assumptions of the models, notably that tagged and untagged animals are captured with equal probabilities."--V. Schultz.

Darwin, J. H. (N. Z. Dept. Sci. & Indus. Res., Wellington, N. Z.) AN ECOLOGICAL DISTRIBUTION AKIN TO FISHER'S LOGARITHMIC DISTRIBUTION. Biometrics 16(1): 51-60. Mar. 1960.--V. Schultz.

Pearse, S. C. (E. Malling Res. Sta., Maidstone, Kent, Eng.) A METHOD OF STUDYING MANNER OF GROWTH. Biometrics 16(1): 1-6. Mar. 1960.
Law of growth can sometimes be suggested by relationship of standard error of log (size) and mean increment in log (size).--V. Schultz.

Shiue, Cherng-Jiann. (School For., U. Minn., St. Paul.) SYSTEMATIC SAMPLING WITH MULTIPLE RANDOM STARTS. For. Sci. 6(1): 42-50. Mar. 1960.
Discusses the objectives of sampling and characteristics of various sampling methods. Since a systematic sample with one random start does not provide a valid estimate of sampling error, the writer proposes a modification which provides a valid estimate. This modification involves multiple random starts.--V. Schultz.

Williams, E. J. REGRESSION ANALYSIS. John Wiley & Sons, Inc., New York, N. Y. ix + 214 p. 1959. $7.50.
The application of regression analysis and a limited amount of theory associated with such analyses are presented in this book. Williams has attempted to write for "research workers in the experimental sciences" and consequently has rather limited his discussion of accompanying theory. Machine calculation methods have been omitted. The book contains the following chapters: linear regression, multiple and polynomial regression, regression equations requiring iterative calculation, choice among regression formulas, estimation from the regression equation, the analysis of covariance, the treatment of heterogeneous data, simultaneous regression equations, discriminant functions and functional relations. The methods are illustrated by real examples; however, the reader will find the examples are primarily from the field of wood technology and that the writer apparently has not searched the biological literature, or even other fields of study, for examples. William's introductory chapter is an excellent presentation on the use of statistics and should be read by all experimental scientists. The book is well written and should be of interest to the applied statistician, but I believe that it is beyond the grasp of most biologists.--From review supplied by V. Schultz.

WILDLIFE--TECHNIQUES

Buechner, H. K., A. M. Harthoorn, and J. A. Lock. (State Coll. Wash., Pullman.) USING DRUGS TO CONTROL GAME. Wild Life (Nairobi, Kenya) 1(4): 49-52. Dec. 1959.
Describes the effects of drugs used in the capturing of Rothschild's giraffe. Dart guns and crossbows were used in the pilot experiment. A similar paper by the same authors is reviewed below.

Buechner, H. K., A. M. Harthoorn, and J. A. Lock. (State Coll. Wash., Pullman.) CONTROL OF AFRICAN WILD ANIMALS. Nature 185(4705): 47-48. Jan. 2, 1960.
Succinyl choline chloride in dosages ranging from 0.13 to 0.35 mg./kg. body weight is being used effectively as the immobilizing agent of 6 spp. of African ungulates. Tranquilizers are used before effects of the drug wear off and then the animal is transported. Small-scale trials have been made in transporting kob (antelope) and black rhinoceros, and the transplanting of some of the 200 remaining Rothschild giraffe is planned. "It is hoped that the methods of immobilizing and transporting animals that are being evolved will contribute materially to the preservation and proper use of wild life in Africa."

Lawrence, William H., and J. H. Rediske. (Weyerhaeuser For. Res. Cent., Centralia, Wash.) RADIO-TRACER TECHNIQUE FOR DETERMINING THE FATE OF BROADCAST DOUGLAS-FIR SEED. Proc. Soc. Am. For. Meeting 1959: 99-101, 1 fig. 1960.
From summ. Described is a technique employing Scandium^{46} as a radio-tracer for Douglas-fir seed. Sc^{46} is a strong gamma emitter which makes it possible to detect buried seeds. In a field test with 440 tagged Douglas-fir seeds, relocation was readily accomplished with a scintillator during the field germination period of 5 months--even though weathering removed up to 25% of the tracer. Fragments of destroyed seeds were recovered from insect and rodent burrows. By the end of the test, 95% of the seeds were accounted for. This radio-tracer technique provides a reliable means of obtaining quantitative data on causes of seed destruction.

Minnesota. MANUAL OF INSTRUCTION FOR GAME LAKE SURVEYS. Minn. Dept. Cons. vi + 91 p., illus. June 1959.
In addition to detailed instruction on mapping and recording field data for game lake surveys, there are appendices on the more common aquatic plants of Minn. and their waterfowl food value, descriptions of wetland types, identification of young ducks, control of aquatic nuisances, regulatory measures on control of aquatic life and propagation of aquatic plants, and waterfowl habitat management. Part two is a reprint of Moyle and Hotchkiss', The aquatic and marsh vegetation of Minnesota and its value to waterfowl. [For review of the original, see WR 44: 30.] This has been modified to conform with the 8th edition of Gray's Manual.

Mossman, Archie S. (Dept. Zool., U. Wyo., Laramie.) A COLOR MARKING TECHNIQUE. J. Wildl. Mgt. 24(1): 104, 1 fig. Jan. 1960.
Adult glaucous-winged gulls (Larus glaucescens) were successfully color marked by placing on their eggs "Thief Detection Powder" obtained from Faurot, Inc., 299 Broadway, New York, N. Y. The parent birds became dyed when the powder came in contact with their wet feathers. Nest desertion did not occur. --Auth. abst.

Zaphiro, Denis. THE USE OF LIGHT AIRCRAFT TO COUNT GAME. Wild Life (Nairobi, Kenya) 1(4): 31-36, illus. Dec. 1959.
Prior to the first aerial game census in 1955, estimates for wildebeeste and zebra on the Athi and Kapiti Plains area (Kenya) were 60,000 and 40,000 respectively. Aerial counts revealed that there were less than 5,000 of either species and the proposed program of population reduction would have seriously endangered their future existence. In Africa, best results can be obtained using 90 hp. aircraft flying at 60 m.p.h. at 700 ft. during the first and last 2 hr. of sunlight on sunny days. Aerial census is more economical and efficient than ground surveys, and has been used in Kenya, Tanganyika, and Uganda.

WILDLIFE--MANAGEMENT & RESEARCH, GENERAL

Burger, George V. (1150 Shorewood Drive, La Crosse, Wis.) MAKING USE OF NATURAL COVER ON SHOOTING PRESERVES. Modern Game Breeding 30(2): 12-16, 8 figs. Feb. 1960.
Recommendations: 1) Determine which native plants can be expected, by examining local succession stages; 2) decide which stage will give the cover needed, where it is needed; 3) work forward by fallowing, or back by burning, cutting, plowing or disking, through the succession series to reach the right natural-cover stage; and 4) plan a long-range rotation program of annual crop plantings and natural cover.

Linduska, Joe. (Remington Farms, Rt. 2, Chestertown, Md.) FIRE FOR BIGGER GAME CROPS. Sports Afield 143(1): 30-31, 88-90, illus. Jan. 1960.
Review article on controlled burning written in a racy, popular manner. It brings to a wide audience the results obtained by biologists working on waterfowl management in the Atlantic Coastal Plain, the Gulf Coast, and the Lake Erie marshes along with those using controlled burning for upland game in Ga., Ky., the Lake States, Texas, and Calif.

Uhlig, Hans G., Wallace G. Anderson, and Wade H. Hamor. (P. O. Box 358, Fergus Falls, Minn.) [INFORMATION SERIES OF LAND MANAGEMENT FOR GAME SPECIES.] US Soil Cons. Serv. (Milwaukee, Wis.). 1959-1960.

A series of information sheets which should prove helpful to farmers and sportsmen who are interested in doing something for wildlife. Each has been abstracted from authoritative references which are cited. General notes, land management practices, range, nesting cover, food and a geographic range map is provided for each species. Each publication consists of a 2-page (single-sheet) processed leaflet. The first three plus number five are by Uhlig. Numbers four, six, seven and eight are by Uhlig and Anderson. Numbers nine through thirteen are by Uhlig and Hamor.

BI- 1	Land Management for Hungarian Partridges	1959
-----	Land Management for Ring-necked Pheasants	"
-----	Land Management for Bobwhite Quail	"
BI- 4	Land Management for Cottontail Rabbits	"
BI- 5	Land Management for Tree Squirrels	"
BI- 6	Land Management for Ruffed Grouse	"
BI- 7	Land Management for Ducks	"
BI- 8	Land Management for Muskrats	"
BI- 9	Land Management for Prairie Chickens	1960
BI-10	Land Management for Sharp-tailed Grouse	"
BI-11	Land Management for Wild Turkey	"
BI-12	Land Management for Mourning Doves	"
BI-13	Land Management for White-tailed Deer	"

Vohs, Paul A., Jr. (Coop. Wildl. Res., Carbondale, Ill.) WIDE-ROW CORN AS A GAME MANAGEMENT TOOL. Trans. 24th N. Am. Wildl. Conf. p. 272-276. 1959.

A 3-year study of the comparative response of cottontail rabbits, bobwhite quail, mourning doves, and Canada geese to wide-row and conventional corn fields was conducted during 1955-8 in s. Ill. Information from eight experimental areas, each including a wide-row field and an adjacent conventional corn planting of comparative size, indicated a greater utilization of the wide-row plantings by cottontails, bobwhites, and mourning doves and increased forage per acre for geese.--From auth abst.

WILDLIFE--HUNTING AREAS & PROBLEMS

Cronemiller, Fred P., and others. (782 University Drive, Los Altos, Calif.) SURVEY OF FISH AND GAME PROBLEMS IN NEVADA. Nev. Legislative Counsel Bur., (Carson City, Nev.), Bul. no. 36. 160 p. [6 figs.] Jan. 1959.

A fact-finding survey of these problems. Part I consists of an analysis of questionnaires sent to all persons holding Nev. resident hunting and combined hunting-fishing licenses for the year 1958. Part II consists of 12 chapters prepared by a survey team directed by Mr. Cronemiller. Chapter IV entitled Administration was written by Colo. Dept. of Game & Fish Director, Thomas L. Kimball. A. Starker Leopold prepared the Big Game Management section; Cronemiller prepared the Upland Game Management section; and Everett E. Horn prepared the Migratory Waterfowl section. In a summary chapter, 23 major recommendations for legislative action and 82 major recommendations that may be accomplished by administrative decision are listed.

Larson, Joseph S. (Mass. Div. Fisheries & Game, Boston.) STRAIGHT ANSWERS ABOUT POSTED LAND. Trans. 24th N. Am. Wildl. Conf. p. 480-487, 2 figs. 1959.

A technical paper presenting the highlights of the author's M.S. study of the posting problem in Mass. A popular account appeared in Mass. Wildl. (see WR 94: 19). For author's abst. of original thesis, see WR 92: 22. In addition to presenting the results of the Mass. Posted Land Survey, this paper gives the details of how the survey was conducted. Of special interest to other researchers who plan state-wide surveys of landowners, will be the description of the sampling method used. The forestry "cruise line" technique was adapted on a state-wide basis to aid in obtaining the desired sample.--From auth. abst.

Smith, J. Robert, and Harold C. Jordahl, Jr. (Wis. Cons. Dept., Madison.) TWO DECADES OF PROGRESS ON WISCONSIN'S PUBLIC HUNTING AND FISHING GROUNDS PROGRAM. Trans. 24th N. Am. Wildl. Conf. p. 322-336. 1959.

Wis. presently leases 257,710 acres at a total average annual cost per acre of 43 cents. Land purchase started in 1939; to date 170,571 acres have cost $2,517,021 on 177 project areas. Current emphasis is given to purchasing wetlands, waterways, access points and headwaters. Including all types of public land in Wis., there are 5,133,778 acres open to public hunting and fishing. Wis. is encouraging zoning, private investment in wildlife, coordination between government agencies, and farmer-sportsmen cooperatives to preserve and improve game habitat on private land.--From abst. by Harold C. Jordahl, Jr.

WILDLIFE--PREDATION, CROP DAMAGE, CONTROL

Besser, Jerome F., and Jack F. Welch. (Bldg. 45, Federal Center, Denver 25, Colo.) CHEMICAL REPELLENTS FOR THE CONTROL OF MAMMAL DAMAGE TO PLANTS. Trans. 24th N. Am. Wildl. Conf. p. 166-173. 1959.

A report on the effectiveness of three newly-developed animal repellent formulations that are now commercially available. Active ingredients of the three are trinitrobenzene-aniline (TNB-A), zinc dimethyl dithiocarbamate cyclohexylamine complex (ZAC), and tetramethyl thiuram disulfide (TMTD). These repellents were extensively tested during a 5-year period under weather conditions prevailing in all regions of the United States, plus several Canadian tests. TNB-A, ZAC, and TMTD were found to be highly effective for protecting plants from damage by rabbits and hares, and useful for protecting plants from deer, meadow mice, beaver, and livestock (cattle and goats) damage. Plants were protected for as long as one year in some tests by the latex or resin adhesives used in these repellent sprays.--From abst. by J. F. Besser.

Gaines, Thomas B. (Public Health Serv., Savannah, Ga.) THE ACUTE TOXICITY OF PESTICIDES TO RATS. Toxicology & Applied Pharmacology 2(1): 88-99. Jan. 1960.

LD_{50} values for 42 pesticides and 2 metabolites of DDT administered in a single dose by the oral or dermal route to adult rats are tabulated. The pesticide Isolan was observed to be different from other compounds tested in that it was considerably more toxic dermally than orally.--From summ.

Kerr, S. H., and J. E. Brogdon. (Agr. Exp. Sta., Gainesville, Fla.) RELATIVE TOXICITY TO MAMMALS OF 40 PESTICIDES. Agr. Chem. 14(9): 44-45, 135-136. Sept. 1959.

Compiled from 36 references. The following data are included in a comprehensive table: Animal species tested; method of administration; carrier for and forms of pesticides; and differences in toxicity by species and sex of test animal.

Mills, Harlow B. (Ill. Nat. Hist. Surv., Urbana.) PEST CONTROL IN THE MODERN SETTING. Trans. 24th N. Am. Wildl. Conf. p. 113-118. 1959.

It is probable that we face an era when pesticidal chemicals must be considered a part of the environment, for their use is not likely to be reduced over large areas. However, such use should be as compatible as possible with wildlife values which may be affected, and where a real and long-lasting injury is possible, such use should be carefully studied to minimize wildlife damage. --From auth. abst.

Rudd, Robert L. (U. Calif., Davis.) RODENT CONTROL BY AIRCRAFT AND PESTICIDAL HAZARDS TO WILDLIFE. Calif. Vector Views 6(4): 23-25. May-June 1959.

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Sweetman, Harvey L. (U. Mass., Amherst.) THE PRINCIPLES OF BIOLOGICAL CONTROL / INTERRELATION OF HOSTS AND PESTS AND UTILIZATION IN REGULATION OF ANIMAL AND PLANT POPULATIONS. Wm. C. Brown Co., Dubuque, Iowa. xii + 560 p., 328 figs. 1958. $8.75.

It is certain that the facts and principles which have been gathered regarding biological control should be known and understood by all natural scientists, particularly those who are concerned with the conservation of our animal resources. An opportunity for the biologist to review the present situation in the field of biological control is furnished by this well digested and organized condensation of the information concerning this field. The book is an up-to-date, extremely readable, revision of "Biological Control of Insects" published in 1936. The new edition has been markedly broadened in scope to include materials from all fields of biological control with new chapters on the antibiotics and the biological control of pest plants. Of necessity the main body of the text deals with biological control in relation to insects. The book is unique as an instructional text involving the over-all principles and facts of biological control. Thorough in its coverage, accurate in its reporting, the book reflects the accumulated knowledge of its writer gained from 25 years of research and teaching in the various fields of economic entomology. Dr. Sweetman's broadly perceptive approach and acute mind is evidenced in his ability to evolve principles and derive substantial generalities from the mass of often biased, sometimes inadequate, data that has accumulated. The book is divided into 15 chapters. It is provided with an extensive bibliography and is profusely illustrated with photographs and line drawings. The body of the text consists of an early history of biological control followed by an invaluable definition of terms. Later chapters cover the use of resistant hosts, antibiotics, bacterial diseases, fungus diseases, virus diseases, protozoan diseases, and parasitic and predatory invertebrate animals. Additional chapters cover the biological relations of beneficial insects to their hosts and prey, handling of beneficial insects, predatory vertebrate animals, evaluation and results of biological control against animals, and finally the biological control of pest plants. The chapters on microorganisms deal in general with history, classification, culture, diagnosis, immunity, transmission, virulence, resistance, and a discussion of the factors involved in the utilization of these organisms in biological control. Dr. Sweetman's book can be highly recommended as an academic instructional text and a useful reference tool for research and field workers in the applied biological sciences. It is hoped that this book will further stimulate the biologist's efforts in the increasingly important field of biological control. --Gordon M. Clark.

Ward, A. Lorin, and Richard M. Hansen. (US F&WS, Denver, Colo.) THE BURROW-BUILDER AND ITS USE FOR CONTROL OF POCKET GOPHERS. US F&WS Spec. Sci. Rep.-Wildl. no. 47. iii + 7 p., 5 figs. Jan. 1960.

Description of the construction, operation and applications of a tractor-drawn machine which has been developed to make artificial gopher runways at controlled depths below the surface of the ground. This machine mechanically places bait in the runways and tests have shown that both the plains pocket gopher and the mountain pocket gopher were controlled effectively (85-100%) through its use.

WILDLIFE--REPORTS OF ORGANIZATIONS & REPORTS OF HARVESTS

Alberta. ANNUAL REPORT OF THE DEPARTMENT OF LANDS AND FORESTS...FOR THE FISCAL YEAR ENDED MARCH 31ST 1959. Queen's Printer (Edmonton). 118 p., illus. 1959.

A brief (10 page) general report of the Fish and Game Administration is included. "High game populations, attractive seasons, good weather and increased leisure time served to cause a continued upward trend in licence sales. Big game...and bird game licence [sales] represent all time highs." Elk and white-tailed deer were underhunted and although a liberal harvest of moose was made, there was a substantial winter die-off attributed to poor range conditions. The wild fur production for the 1958-9 season is tabulated by species, and number and value of pelts.

Arizona. 30 YEARS OF PROGRESS. Ariz. Game and Fish Dept. Wildl. Views 7 (1): 1-60, illus. Jan. 1960.
Annual report issue. Presents, in addition, the history of the Game Management, Fish Management, Wildlife Protection, Information and Education, Administration and Technical Divisions. Some highlights of the Game Management Report: The deer kill in Ariz. increased over 5 times from 6,328 in 1946 to 33,130 in 1958. During this 12-yr. period, hunter success more than doubled (18% to over 40%). From the first elk season in 1935 through 1958, 11,615 elk were harvested legally with hunter successes varying from 13.2% to 51.5%. Kill and hunter success for antelope, turkey, javelina, bighorn, and buffalo for 1958 are tabulated. Shifting from a game farm bird-raising program to one of habitat development was effected during the period to the benefit of small game and waterfowl.

Maguire, H. F. (N. Y. State Cons. Dept., Albany.) SMALL GAME HARVEST -- 1958-59. N. Y. State Cons. 14(3): 14-15, 3 figs. Dec.-Jan. 1959-60.
Graphic presentation of data on average take per hunter, small game hunting success and the effect of dogs on hunting success. Based on a 72.2% return of questionnaires mailed to 7,212 licensees. Take for major species: rabbits almost 1.6 million, squirrels over 1 million and pheasants 391,900. Small game hunters spent more time afield during 1958-9 than during any of the 2 previous seasons which have been analyzed statistically.

Maryland. TWENTY-FIRST ANNUAL REPORT OF THE DEPARTMENT OF GAME AND INLAND FISH / 1959. Md. Cons. 36(5)[6]: 1-32, illus. Nov.-Dec. 1959.
Report for year ending June 30, 1959. In the game management section (pages 3-11), the wildlife habitat improvement work and the investigations in waterfowl, deer and wild turkeys are summarized. Tables are presented showing distribution and releases of game birds; live trapping and releases of rabbits, squirrels, raccoons, deer and beaver; and the total deer kill by county and type of season.

New Jersey. ANNUAL REPORT OF DIVISION OF FISH AND GAME FOR THE FISCAL YEAR COMMENCING JULY 1, 1958 AND ENDING JUNE 30, 1959. 1-68 p. [1959.]
In the wildlife management section (p. 33-45), the statistics of population level, sex and age ratios of deer are summarized; the small game harvest for 1958-9 is estimated; and summaries of investigational activities are included. Progress for projects on wildlife control, deer management, forest management, farm game habitat restoration, and state game farms for the 1958-9 period are also summarized. Deer drives were initiated for the northern census areas to complement roadside track counts on the southern census areas in an effort to obtain statewide deer population estimates.

Oregon. 1959 ANNUAL REPORT...GAME DIVISION. Oreg. State Game Comm. vi + 177 p., illus. [1959.]
A comprehensive annual report covering the 1958 harvest and 1959 status of Oreg. big game, small game, waterfowl and furbearers--supplemented by research and management findings. Information is summarized in 113 tables.

Saskatchewan. ANNUAL REPORT OF THE DEPARTMENT OF NATURAL RESOURCES...FOR THE FISCAL YEAR ENDED MARCH 31, 1959. Queen's Printer (Regina). xvi + 196 p., illus. 1959.
In the 24-page report of the Wildlife Branch, game conditions are summarized. Tables present material on the estimated game harvest for the 1958 season by species of game birds and big game, the seasonal take of wild fur for the period 1949-50 to 1958-9, and the value of the pelts in 1957-8 and 1958-9.

Sauer, Richard. HUNTING PRESSURE COMPOSITION IN NEW YORK. N. Y. State Cons. 14(3): 16-17. Dec.-Jan. 1959-60.
Analysis by age group and place of residence of big game and small game licensees in N. Y. state.

Seaton, Fred A. 1959 ANNUAL REPORT, SECRETARY OF THE INTERIOR. US Govt. Printing Office, Wash., D. C. lxvii + 459 p., illus. 1959. $3.00, paper, from Supt. Documents.

A report on the programs and accomplishments of the various agencies. The reports of the Bureau of Reclamation, Geological Survey, Indian Affairs, Park Service, and Fish & Wildlife Service should be of special interest to wildlifers. The reports of the other bureaus are of general interest. The 59-page Resources for a Growing Population serves to align these diverse programs into the over-all pattern of the Department.

West Virginia. [ANNUAL REPORT, CONSERVATION COMMISSION, FISCAL YEAR 1958-59.] W. Va. Cons. 23(10): 1-48, illus. Dec. 1959.

The Game Management Section, p. 3-13, summarizes the research and development work on farm game, white-tailed deer, turkey, black bear, and waterfowl projects. Habitat development on the management areas is also summarized.

WETLANDS & WILDLIFE

Davison, Verne E., and Wm. W. Neely. (US SCS, Athens, Ga.) MANAGING FARM FIELDS, WETLANDS, AND WATERS FOR WILD DUCKS IN THE SOUTH. USDA Farmers Bul. no. 2144. i + 14 p., illus. 1959.

Methods of making farm fields, woodlands, marshes, and fresh- and brackish-water ponds attractive to waterfowl are described and hunting suggestions are included.

Givens, Lawrence S., and Thomas Z. Atkeson. (US F&WS, Peachtree-7th Bldg., Atlanta 23, Ga.) FARMING FOR WATERFOWL IN THE SOUTHEASTERN UNITED STATES. US F&WS, Atlanta, Ga. 1-44 p., 10 figs. Revised Oct. 1959.

A revision of a useful paper (see WR 91: 29) which tells how to manage 36 different crops for waterfowl use. The photos, a table of vital statistics on the members of the millet group, and a table on cold-weather recovery rates for green grazing crops have been added and recent information has been incorporated in the text and tabulations.

Hunt, George S., and Richard W. Lutz. (U. Mich., Ann Arbor.) SEED PRODUCTION BY CURLY-LEAVED PONDWEED AND ITS SIGNIFICANCE TO WATERFOWL. J. Wildl. Mgt. 23(4): 405-408. Oct. 1959.

Reduction in water levels to a depth of 3-12 in. is believed to be the cause of the excellent production of curly-leaved pondweed seeds which occurred in a marsh at the west end of Lake Erie in 1958. Seeds collected from two milacre plots indicated that one acre would support 500 to 1,000 mallard-sized ducks for one day. A food habits study showed that 11 ducks of 15 collected had used the seeds of this pondweed. Proposed water level management: (1) draw down in spring to leave 3 to 12 inches of water over P. crispus beds, (2) maintain those depths throughout the growing season.--From abst. by G. S. Hunt.

Office of River Basin Studies. WETLANDS INVENTORY OF CONNECTICUT. US F&WS, 1105 Blake Bldg., 59 Temple Pl., Boston 11, Mass. 19 p., 2 maps. June 1954, revised June 1959.

An inventory of all inland wetlands over 40 A. in size and all coastal marshes over 10 A. revealed a total of 681 areas, totalling 66,834 A. Seventy-nine were classified as being high or moderate in value to waterfowl and 602 were classified as low or negligible in waterfowl value. Vulnerability surveys conducted in 1955 and in 1959 revealed that a total of 1,332 A. have been destroyed and 6,656 A. are in imminent danger of being destroyed. Based on a survey of 191 negligible value areas, 80% of such areas can be improved to increase their value to waterfowl.--From summ.

Scheffer, Paul M. (SCS, Berkeley, Calif.) FARMING FOR WATERFOWL IN THE PACIFIC FLYWAY. Trans. 24th N. Am. Wildl. Conf. p. 238-244. 1959.

Farming for waterfowl is replacing the hit or miss methods of waterfowl food plant selection and establishment commonly used by private landowners. The waterfowl food crop on "farmed" acreage can now be predicted in terms of pounds of food or duck days feeding per acre. In 1957 and 1958, the SCS, through soil conservation districts in Calif. and Oreg. gave technical, on-site assistance to 65 individual farmers and 11 duck clubs--resulting in 5,100 acres of private land developed and managed for waterfowl. Pilot land development and management projects are scheduled in Utah, Ariz., Idaho, Wash., and Calif. in 1959. Superior waterfowl food plants for the Pacific Flyway are being developed under a cooperative agreement.--From auth. abst.

FARMLAND & WILDLIFE

Allan, Philip F., and Wilmer W. Steiner. AUTUMN OLIVE FOR WILDLIFE AND OTHER CONSERVATION USES. USDA, Leaflet no. 458. 8 p., illus. Nov. 1959. 5¢ from Supt. Documents.

"People in the East who want to attract wildlife, conserve soil, beautify odd areas, establish plant barriers, or make ornamental plantings will find autumn olive a valuable plant." Its fruit is utilized by bobwhite quail, ruffed grouse, ringnecked pheasants and songbirds.

Graetz, Karl E. (SCS, Raleigh, N. C.) TICKCLOVER -- FOR QUAIL AND LIVESTOCK. Soil Cons. 25(8): 173-175, 1 fig. Mar. 1960.

A strain of Dillen's tickclover (Desmodium perplexum) has proved to be effective for forage and wildlife use--and is adapted to most of the Southeast with the possible exception of peninsular Fla. Most of the material in this article has also been presented in Wildl. in N. C. 24(2): 8-9, Feb. 1960, in an article by Graetz entitled: Tickclover -- Old Plant With New Role.

RANGELAND & WILDLIFE

Brown, Ellsworth Reade, and Charles F. Martinsen. (Martinsen: 821 St. John, Walla Walla, Wash.) BROWSE PLANTING FOR BIG GAME: Wash. State Game Dept., Biol. Bul. no. 12. 1-63 p. + 21 pls. [figs.] Dec. 1959.

An informative bulletin recounting the testing of 123 browse spp. in Wash. of which 18 were suitable for planting. This bulletin is a more detailed account of a paper by Brown reviewed in WR 96: 26.

Dietz, Donald R., Robert H. Udall, Harold R. Shepherd, and Lee E. Yeager. (US F&WS, Ft. Collins, Colo.) SEASONAL PROGRESSION IN CHEMICAL CONTENT OF FIVE KEY BROWSE SPECIES IN COLORADO. Proc. Soc. Am. For. (Salt Lake City, Utah). p. 117-122, 6 figs. 1958.

Material from a thesis by the senior author listed in WR 94: 54. Big sage brush, bitterbrush, mountain mahogany, Gambel oak and serviceberry were collected seasonally from the Mesa Verde region of Colo. to determine their proximate chemical analysis. They were tested for moisture, ash, calcium, phosphorus, crude protein, crude fat, crude fiber, nitrogen-free extract, and carotene. Big sagebrush had the highest seasonal mean percentages of protein, phosphorus, and crude fat, and the lowest mean percentages of crude fiber, nitrogen-free extract and calcium. Gambel oak and serviceberry had wide calcium-phosphorus ratios during the late-fall and late-winter seasons when they are only lightly utilized, while bitterbrush and mountain mahogany showed a wide ratio between these minerals during late spring and late summer--seasons of relatively light deer usage. Deer were observed to choose browse with highest amounts of important nutrients during each season, especially in the case of protein. Thus, the deer range must contain mixtures of preferred browse species to supply sufficient nutrients in balanced form during all seasons.--From summ.

Smith, Dixie R., and Don E. Wilbert. (U. Wyo., Laramie.) GAME/LIVESTOCK COMPETITION IN THE JACKSON HOLE REGION OF WYOMING (PROGRESS REPORT I). Wyo. Agr. Exp. Sta., Mimeo. Circ. no. 106. 10 p. Feb. 1959.

A study of game/livestock competition in the Gros Ventre drainage was initiated in the fall of 1957. Utilization data, based upon linear measurements of browse plants, are presented which represent game use during the winter of 1957-58. During this period, browse utilization within the drainage as a whole was not excessive. However, certain localized problem areas have appeared. It is much too early to make generalizations.--From authors' summ.

Yeager, Lee E., compiler. (Colo. Coop. Wildl. Res. Unit, Fort Collins.) FACTORS AFFECTING THE QUALITY AND MANAGEMENT OF BIG GAME WINTER RANGE IN COLORADO. Colo. Dept. Game & Fish, Current Rep. no. 30. iv + 29 p. Jan. 1960.

In this compact report, "the key findings reported in about 800 pages of typewritten text and several thousand pages of raw data are presented--studies involving about 16 man-years of work at the graduate level!" Major headings are physical environment, range, nutrition and population dynamics.

FORESTLAND--FORESTRY & ECOLOGY

Dodds, Donald G. (Dept. Cons., Cornell U., Ithaca, N. Y.) FOOD COMPETITION AND RANGE RELATIONSHIPS OF MOOSE AND SNOWSHOE HARE IN NEWFOUNDLAND. J. Wildl. Mgt. 24(1): 52-60, 4 figs. Jan. 1960.

Food habit studies of moose and snowshoe hare in Newf. indicate that 27 of the 30 woody plant species browsed by moose are browsed by snowshoe hare. Moose and hare depend upon herbaceous vegetation during the summer and woody plants during winter. Both species browse plants under six feet most heavily, and browse most plants taken to a high degree of intensity. Browsing of balsam fir by moose retards cover growth for hares in areas where fir reproduction is dominant. Birch is the favored hare food and the favored deciduous woody food for moose. Competition for birch reached a peak in the areas sampled in 22-year-old cutover. Serious competition between moose and hares occurs only in cutover areas where fir and birch are the dominant species. In these areas, heavy moose browsing may accelerate the reduction of available hare browse species, creating a winter food scarcity in a 26- to 30-year period.--Auth. abst.

FORESTLAND--MANAGEMENT FOR & DAMAGE BY WILDLIFE

Ashby, K. R. PREVENTION OF REGENERATION OF WOODLAND BY FIELD MICE (APODEMUS SYLVATICUS L.) AND VOLES (CLETHRIONOMYS GLAREOLUS SCHREBER AND MICROTUS AGRESTIS L.). Quart. J. For. 53(3): 228-236. 1959. [From Biol. Abst. 35(5).]

Burckhardt, Dieter. ÜBER DIE BIOLOGISCHEN URSACHEN DER WILDSCHÄDEN IM WALD. [BIOLOGICAL CAUSES OF GAME DAMAGE IN THE FOREST.] Schweiz. Z. Forstw. 110(9): 598-616. 1959. [From Biol. Abst. 35(5).]

[In German.] The heavy increase in numbers of game animals, especially roe and red deer, in Switzerland in the last 50 years has resulted in serious damage to the forests. Tree bark and twigs are natural food of deer. The author recommends the establishment of a research center to study the biology of the game animals and their relation to forest vegetation, as a basis for corrective measures.--W. N. Sparhawk.

Eiberle, K. (Eidgen. Tech. Hochschule, Zurich.) DIE WILDSCHÄDENPROBLEME IM WALDBAU. [PROBLEMS OF DAMAGE BY GAME ANIMALS IN SILVICULTURE.] Schweiz. Z. Forstw. 110(9): 585-597. 1959. [From Biol. Abst. 35(5).]

[In German.] Game animals, especially roe and red deer, cause much damage to many of the forests and constitute a serious and expensive handicap to good silviculture. Estimates of the total annual damage in the Swiss forest, including costs of remedial and control measures, are presented. Suggestions are made for forest and game-management practices that will alleviate the situation.--W. N. Sparhawk.

Magnani, G. DANNI PRODOTTI DA RODITORI SU PIOPPO E ONTANO (STUDIO SULLE CICATRIZZAZIONI E SUI TESSUTI CICATRIZIALI). [DAMAGE BY RODENTS ON POPLAR AND ALDER (STUDY OF CALLOUS FORMATION AND CALLOUS TISSUES).] Ente Naz. per la Cell. e per la Carta. Cent. di Sper. Agr. e Forest. P. 2: 119-135. 1958. [From Bibliog. Agr. 24(1), 1960.]
In Italian with English summ.

Scieur, M. CONSIDÉRATIONS SUR LES CLÔTURES COMME MOYEN DE PROTECTION CONTRE LES DÉGÂTS DE GIBIER. [CONSIDERATIONS UPON EXCLOSURES AS A MEANS OF PROTECTION AGAINST DAMAGE BY WILDLIFE.] Soc. Roy. Forest. de Belg. B. 66(5): 278-298. May 1959. [From Bibliog. Agr. 24(1), 1960.]
In French.

CONTROL OF VEGETATION WITH HERBICIDES ETC.

Brinkman, Kenneth A. (Cent. States For. Exp. Sta., Columbus 15, Ohio.) KILLING OAK BRUSH / A TRICKY BUSINESS. Cent. States For. Exp. Sta. Tech. Pap. 165. 9 p., 1 fig. Dec. 1959.
The effectiveness of 33 herbicide treatments for killing oak reproduction was tested in a natural stand consisting of some 4,000 three-year old sprouts per acre. Mostly blackjack oak with black, post, white and scarlet oaks present. Herbicides included ammate, 2,4-D, 2,4,5-T and monuron in different concentrations. Sprays were applied in June, Aug. and Sept. of a dry year. Monuron killed nearly all reproduction regardless of species or month of application--but was too expensive. The effectiveness of the other sprays depended both on the species of oak and the month of application. Relative costs per acre and percent of kills made by the various treatments are tabulated.

Cook, David B. THE HATCHET AND OILCAN TECHNIQUE FOR THE APPLICATION OF SODIUM ARSENITE. J. For. 57(11): 845-847. Nov. 1959.
Describes the equipment, techniques and results of a "safe, quick, simple, sure and cheap way to eliminate unwanted trees, both hardwood and softwood." In half a day one man can treat 250-300 trees using one half gallon (6 lb. arsenic trioxide / gal.) of solution. Risk to workers and wildlife is reduced to the absolute minimum.

Harvey, W. A. (U. Calif., Berkeley.) NEW HERBICIDES. Agr. Chem. 15(2): 41-43, 106-107. Feb. 1960.
Chemicals are grouped according to use. Primary breakdown is into selective herbicides and non-selective ones; secondary breakdown into foliage applications and soil applications is based on the way the chemical enters the plant--either through the leaves or through the roots. A summary paper with stress upon the uses of herbicides.

Levi, E. (C.S.I.R.O., Griffith, New South Wales, Aust.) CHEMICAL CONTROL OF TYPHA ANGUSTIFOLIA L. VAR. BROWNII. Weeds 8(1): 128-138, 4 figs. Jan. 1960.
The ethyl ester of 2,4-D applied at the rate of 6 lb./A. in oil emulsion gave good control of narrow leaf cattail in Australian irrigation channels. Best effect resulted when chemical was used on the 5-7 leaf stage of growth and when water levels were maintained at 3 feet subsequent to treatment. Amitrol and Dalapon used in water solution proved very satisfactory for control of Typha growing under conditions of fluctuating water levels. Amitrol gave complete control of Typha for at least 15 months after application. Paspalum, Juncus and Cyperus were eliminated by Amitrol.

Ranwell, D. S., and B. M. Downing. (Nat. Conservancy Res. Sta., Wareham, Dorset, Eng.) THE USE OF DALAPON AND SUBSTITUTED UREA HERBICIDES FOR CONTROL OF SEED-BEARING SPARTINA (CORD GRASS) IN INTER-TIDAL ZONES OF ESTUARINE MARSH. Weeds 8(1): 78-88, 2 figs. Jan. 1960.
Spartina control in relation to nature conservation problems is briefly discussed. Spread of Spartina on English coast has seriously limited the feeding grounds of brent geese, widgeons and other waterfowl that feed on Zostera and Enteromorpha. Large areas covered by Zostera already much reduced by disease in the 1930's have been further depleted by the spread of Spartina. Dalapon at 50 lb./A. gave a 100% kill of Spartina growth one year after (July)

spraying. Re-invasion by seedlings indicated repeated applications necessary. Fenuron at 40 lb./A. gave 99% kill when applied in April. There was no significant re-growth 1.5 years after spraying. A pelleted combination of Fenuron, 2,4-D and sodium borate injected into mud or sprinkled on the surface at 15 lb./A. gave a 60% kill in Spartina marsh reached daily by the tides.

Trumbo, Harold A. TECHNIQUES INVOLVED IN THE USE OF CHEMICALS FOR ESTABLISHING WILDLIFE CLEARINGS. Va. Coop. Wildl. Res. Unit, Release no. 59-11. 4 p. (mimeo.) 1959.

Four herbicides were tested as tools in establishing wildlife clearings. Fenuron and Monuron hold the greatest promise for success; these chemicals were easier to transport and apply than the solutions of 2,4,5-T and Ammate X. [Paper presented at Va. Acad. Sci. Meeting, Charlottesville, May 8, 1959.]--From abst. by Burd S. McGinnes.

MAMMALS--GENERAL

Charkey, Lowell W., and Paul A. Thornton. (Colo. State U., Fort Collins.) A SIMPLE METHOD FOR ESTIMATING OXYGEN CONSUMPTION OF SMALL ANIMALS. Poultry Sci. 38(4): 899-902, 1 fig. July 1959.

Describes the procedure of estimating oxygen consumption using a large desiccator (10 in. inside diameter) as the animal chamber, gas buret with attached leveling bulb for maintaining atmospheric pressure and a means for providing water-saturated oxygen.

Farrand, Richard L., G. Edgar Folk, Jr., and Marvin L. Riedesel. TYPES OF MAMMALIAN HIBERNATION. Proc. Iowa Acad. Sci. 63: 724-728. 1956. [From J. Mamm. 41(1), 1960.]

Finley, Robert B., Jr. (Wildl. Res. Lab., Denver, Colo.) OBSERVATION OF NOCTURNAL ANIMALS BY RED LIGHT. J. Mamm. 40(4): 591-594. Nov. 1959.

Night observations were made by use of simple equipment such as a 3-cell flashlight and a 6-volt lantern with red acetate filters. Eight species of mammals were observed with varying degrees of success. The method is successful for watching animals with predominantly nocturnal retinas consisting of rod receptors that are insensitive to red light. For best results the observer's eyes should be fully dark-adapted and should avoid all exposure to white light. Under favorable conditions, red light observation is a direct means of getting information not available in any other way.--Author.

Johnson, Murray L., and Burton T. Ostenson. (Coll. Puget Sound, Tacoma, Wash.) COMMENTS ON THE NOMENCLATURE OF SOME MAMMALS OF THE PACIFIC NORTHWEST. J. Mamm. 40(4): 571-577. Nov. 1959.

The methods section of this paper is largely an outline of taxonomic methods which are either fully accepted or show promise in establishing relationships of subspecies, species and genera of mammals. This outline also includes literature references for these techniques. These methods are applied to Pacific Northwest mammals.

Leitch, I., F. E. Hytten, and W. Z. Billewicz. (Commonwealth Bur. Anim. Nutrition, Bucksburn, Aberdeenshire, Eng.) THE MATERNAL AND NEONATAL WEIGHTS OF SOME MAMMALIA. Proc. Zool. Soc. London 133(1): 11-28, 2 figs. Oct. 1959.

From summ. When a comparison is made between maternal weight and weight of young in mammals, the significant relation is of maternal weight to total weight of young at birth. A collection of data for 114 species is presented. The logarithms of maternal and newborn weights have a straight line relation from bats to whales. Relatively the larger mammals carry a smaller weight of young. Sources of variation in the ratio of weight of young to weight of mother are discussed, and a brief comparison is made with the results of Heinroth's analysis of weights of birds and their eggs.

Libby, Wilbur L. (Alaska Dept. Fish & Game, College.) THE DISTRIBUTION OF SOME SMALL MAMMALS IN EASTERN INTERIOR ALASKA. J. Mamm. 40(4): 607-609. Nov. 1959.

For 15 spp. at 15 locations.

Pruitt, William O., Jr. (Box 282, College, Alaska.) ANIMALS IN THE SNOW. Sci. Am. 202(1): 60-68, illus. Jan. 1960.
A popular and attractive presentation and review of material published previously in journals of more limited distribution. [See WR 91: 10, 91: 11, and 97: 40 for listing of some of these.] Discusses snow characteristics, adaptions of animals living in regions of persisting snow, and relates these to Formozov's scheme of classification of mammals on the basis of their adaption to snow. The terminology of snow is tabulated with Eskimo and Indian equivalents.

Pruitt, William O., Jr. (Box 282, College, Alaska.) LOCOMOTOR SPEEDS OF SOME LARGE NORTHERN MAMMALS. J. Mamm. 41(1): 112. Feb. 1960.
The speed of "unhurried locomotion of several large mammals in an undisturbed state" was measured. These speeds (in miles per hour) were: barren-ground grizzly -- 1; wolf -- 4; barren-ground caribou -- 5; and musk ox -- 3.

Wishart, W. D. (Dept. Lands & For., Edmonton, Alta.) WILDLIFE PREDATION. Land-For.-Wildl. 2(4): 4-12, illus. Nov.-Dec. 1959.
A review paper supplemented with tables of information pertinent to Alberta.

MAMMALS--FAUNAS AND MANUALS

Denis, K., compiler. (317 Morse St., Port Arthur, Ont.) MAMMALS OF THE PORT ARTHUR & GERALDSON FOREST DISTRICT / THUNDER BAY DISTRICT, ONTARIO. Thunder Bay Field Nat. Club Newsletter, Suppl. No. I. 18 p. 1959.
A list, annotated as to range, relative abundance and locality records, of 56 spp. of recent mammals found in the 29,213 square miles of the Thunder Bay District of Ontario. The area lies chiefly in the Canadian Zone of the Boreal Forest Region.

Ivey, R. DeWitt. (3312 Alvarado Dr. NE., Albuquerque, N. Mex.) THE MAMMALS OF PALM VALLEY, FLORIDA. J. Mamm. 40(4): 585-590. Nov. 1959.
A study of a coastal area containing a close intermixture of diverse mammal habitats was made intermittently between 1939 and 1956, producing a list of 34 mammal species with ecological and life history notes. Wherever observed, adaptation to and occurrence in the specialized coastal environments, such as dunes, salt marsh and wind-stunted forest are noted. Fluctuation in numbers, breeding data and nest construction are described for some species.--Auth. abst.

McCarley, Howard. (Southeastern State Coll., Durant, Okla.) THE MAMMALS OF EASTERN TEXAS. Texas J. Sci. 11(4): 385-426, 2 figs. Dec. 1959.
The present geographic and ecologic distribution and changes in the mammalian fauna of e. Texas since the early 1900's. Fifty-six species of mammals occur or have occurred in e. Texas during the period.

Sargeant, Alan B., and William H. Marshall. (U. Minn., St. Paul.) MAMMALS OF ITASKA STATE PARK, MINNESOTA. The Flicker 31(4): 116-123, 126-128. Dec. 1959.
A treatment by families of the mammals of this 32,000-acre park followed by a checklist of the species based on records to Aug. 1959.

Schwartz, Charles W., and Elizabeth R. Schwartz. (Mo. Cons. Comm.) THE WILD MAMMALS OF MISSOURI. U. Mo. Press & Mo. Cons. Comm. xvi + 341 p., 57 pl., many figs. 1959. $5.95 from U. Mo. Press, Columbia, Mo.
Hundreds of exquisite drawings by that master of black-and-white techniques, Charles Schwartz, make this our most beautiful state mammal book. Great amounts of natural history information, all popularly presented, make it one of our most informative state mammalogies for readers of varied ages and backgrounds. The book begins with a short introduction to mammals and to the natural regions of Mo., but soon gets down to species accounts. These accounts are exceptionally long and complete. They take up: derivation of names, form, color, measurements, important cranial features, sex criteria and ratios, age criteria and longevity, glands, voice, distribution and abundance, habitats, habits, foods, reproduction, adverse factors, importance, and management or

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control. The authors used much recent research literature and cite major papers for each species. But they wrote so simply that anyone can understand the book. Identification is facilitated by keys to whole animals and to skulls, by descriptions, and by admirable drawings of living animals, feet, skulls, teeth, and tracks. Surely it would be hard to improve on many of these drawings for beauty, detail, and the interest of animals in action. Small maps of total ranges are presented for all species. These are generally good, but the black bear is not shown as occurring on the Carolina coast or in ne. La. The only other flaw I noted is that "intergradation" is sometimes used when "interbreeding" is all that is meant. The authors were not writing primarily for professional mammalogists, so they did not go into details about subspecies, variation within the state, or local distribution. Correspondingly, they did not attempt to tell how to distinguish the 5 species of Peromyscus in Mo. This is all to the good, but it means that there is still room for another work on the mammals of Mo.--W. H. Stickel.

Zimmermann, Klaus. TASCHENBUCH UNSERER WILDLEBENDEN SÄUGETIERE. [POCKET BOOK OF OUR WILD MAMMALS.] Urania Verlag (Leipzig). 169 p., illus. 1959. [From J. Mamm. 41(1), 1960.]
In German.

MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES

de Vos, Antoon, and Edward M. Ray. (Ont. Agr. Coll., Guelph.) HOME RANGE AND ACTIVITY PATTERN OF AN ARCTIC GROUND SQUIRREL. J. Mamm. 40(4): 610-611, 1 fig. Nov. 1959.
Home range estimated to be 10 acres--based on daily observations made in June-July. For June, activity greatest during early morning hours, less active in the afternoon and inactive after 6:25 p.m. to 4:00 a.m. despite continuous daylight.

Gomez N., Juan C. (Johns Hopkins U., Baltimore, Md.) CORRELATION OF A POPULATION OF ROOF RATS IN VENEZUELA WITH SEASONAL CHANGES IN HABITAT. Am. Midl. Nat. 63(1): 177-193, 5 figs. Jan. 1960.
Island study. A total of 153 different rats [89 ♂♂ : 64 ♀♀] were observed 327 times. No sexual difference noted in trapability. Distribution and abundance correlated with rainfall, food and shelter. Life expectency influenced by relation of month of birth to the seasons. Rats born in the dry season survived through the wet season but few born in the wet season survived through the dry.--From summ.

Patric, Earl F. SOME PROPERTIES OF THE SMALL MAMMAL POPULATIONS OF THE HUNTINGTON WILDLIFE FOREST. Ph.D. thesis, Syracuse U. 202 p., 35 figs. 1958.
Small mammal populations are highly variable. Both population density and species composition were found to change markedly during the successive years sampled. Population densities were also found to vary within given years. Normally, the populations were sparse in April, reached a peak in July, and were again sparse by October. Species composition did not vary markedly within the individual years examined. Adult animals predominate in the spring and fall; subadults and juveniles predominate in the summer. Two periods of breeding occur: May and Aug. Breeding occurs more frequently and litter sizes are largest during periods of low population. Small mammal home ranges and cruising radii values are examined. When trapping stations are spaced at less than twice the value of the small mammal cruising radii, the capture rates will not be uniform throughout the trapline. This non-uniform distribution can be used to estimate the cruising radius. The value of closely spaced trapping stations in sampling small mammal populations is questioned and discussed. An improved method for sampling small mammals is suggested.--From long abst.

Wirtz, Wm. O. II, and Paul G. Pearson. (Rutgers State U., New Brunswick, N. J.) A PRELIMINARY ANALYSIS OF HABITAT ORIENTATION IN MICROTUS AND PEROMYSCUS. Am. Midl. Nat. 63(1): 131-142. Jan. 1960.
Microtus is positively orientated to the broomsedge habitat, it is more aggressive than Peromyscus, and when the Microtus population level is high, few Peromyscus are found in broomsedge. Artificial habitat studies indicated further that Peromyscus is randomly oriented in regard to habitat.

MAMMALS--PARASITES AND DISEASES

Charkes, N. D. HEMAGGLUTINATION TEST IN TULAREMIA. J. Immunol. p. 213-220. Aug. 1959.
This test may yield positive results earlier in the course of the infection and aid in diagnosis.--David O'Meara.

Florschutz, Otto, Jr., and Richard F. Darsie, Jr. (Rt. 2, Box 178, Aurora, N. C.) ADDITIONAL RECORDS OF ECTOPARASITES ON DELAWARE MAMMALS. Ent. News 71 (2): 45-52. Feb. 1960.
During winter 1958, 28 small mammals of 5 spp. were live trapped in Delaware and examined for ectoparasites. Hosts were Microtus pennsylvanicus, Mus musculus, Peromyscus leucopus, Syvilagus floridanus, and Didelphis virginiana. Six species of mites, 2 of lice and 4 of fleas were recovered. [Supplements MacCreary, 1945; reviewed in WR 43: 12.]

Henderson, G. N. (The Distillers Co., Ltd., London.) REVIEW OF LITERATURE ON CANINE VIRUS HEPATITIS. Brit. Vet. J. 115(9): 329-333. Sept. 1959.
Said to be identical to the fox encephalitis reported by Green and Shiller (1934). The largest, liveliest dogs are the first to fall victims to the disease.--David O'Meara.

Hirschberg, N., R. Menges, M. P. Hines, and M. M. Galton. (N. C. Board Health.) BACTERIOLOGICAL STUDIES OF WILD ANIMALS. Vet. Med. 54(7): 353-355. July 1959. [From Vet. Bul. #2221, July 1959.]
Of 90 trapped mammals cultured, 19 isolations of pathogenic bacteria were recovered.--David O'Meara.

McGinnes, Burd S. INCIDENCE AND CAUSES OF TULAREMIA IN HUMANS IN VIRGINIA. Va. Coop. Wildl. Res. Unit Release no. 59-7. 4 p. (mimeo.) 1959.
A study of 102 human tularemia cases in Va. revealed that the disease occurred in 85% of the counties. The cottontail rabbit accounted for 62.7% of the cases, next in importance were ticks, which caused 15.7% of human tularemia. Two peak periods of disease incidence appear; immediately after hunting season and during tick season. One fatality was reported. [Paper presented at Va. Acad. Sci. Meeting, Charlottesville, May 8, 1959.]--From auth. abst.

McKeever, S., G. W. Gorman, J. F. Chapman, M. M. Galton, and P. K. Powers. INCIDENCE OF LEPTOSPIROSIS IN WILD MAMMALS FROM S. W. GEORGIA WITH A REPORT OF NEW HOSTS FOR SIX SEROTYPES OF LEPTOSPIRES. Am. J. Trop. Med. & Hyg. 7: 646-655. 1958. [From Vet. Bul. #1341, May 1959.]
Lepto cultured from kidneys of 44 out of 820 mammals trapped. New hosts listed are gray fox, raccoon, striped skunk, wildcat, opossum.--David O'Meara.

Nordland, O. S. HOST-PARASITE RELATIONS INITIATION OF INFECTION. I. OCCURRENCE OF LISTERIOSIS IN ARCTIC MAMMALS WITH A NOTE ON ITS POSSIBLE PATHOGENESIS. Can. J. Compar. Med. & Vet. Sci. 23(12): 25-32. Dec. 1959.
This paper reports the examination of lemmings, voles and foxes for the presence of Listeria monocytogenes and presents speculations concerning the pathogenesis of Listeriosis. L. monocytogenes was isolated for the first time from an arctic fox.

Roemmele, O. WILDSEUCHEN UND REVIERHYGIENE IN NIEDERSACHSEN. [DISEASES OF GAME IN LOWER SAXONY.] Deutsch. Tierarztl. Wschr. 66: 118-121. 1959. [From Vet. Bul. 29(8), #2615. 1959.]
In German with English summ. The most widespread wildlife diseases are rabies in fox and deer, myxomatosis and coccidiosis in hares and rabbits.--David O'Meara.

SHREWS, MOLES, BATS

Davis, Wayne H. (Middlebury Coll., Vt.) TAXONOMY OF THE EASTERN PIPISTREL. J. Mamm. 40(4): 521-531, 2 figs. Nov. 1959.
A study of the geographical variation of Pipistrellus subflavus. A synopsis of the subspecies is given and their distribution mapped. One name is placed in synonomy. Pipistrellus subflavus subflavus (F. Cuvier) (= P. s. obscurus Miller). [Davis' Ph.D. thesis on population dynamics and taxonomy of this species was reviewed in WR 92: 44.]--From auth. abst.

Glass, Bryan P. (Okla. State U., Stillwater.) ADDITIONAL RETURNS FROM FREE-TAILED BATS BANDED IN OKLAHOMA. J. Mamm. 40(4): 542-545, 4 figs. Nov. 1959.
Forty band returns secured during 1956 and 1957 from bats banded in w. Okla. indicate that the species executes a regular southerly migration from Sept. to Nov., going at least as far south as the Rio Grande Valley and n. Mexico. A northward movement occurs in spring, with the bats returning to Okla. in May. Females of known age were found pregnant when one year old.--Author.

Herreid, C. F. II. (Johns Hopkins U., Baltimore, Md.) NOTES ON A BABY FREE-TAILED BAT. J. Mamm. 40(4): 609-610. Nov. 1959.
Organ weights, body measurements and observations on a newly born Mexican free-tailed bat are presented.--Author.

Herreid, Clyde II. (Johns Hopkins U., Baltimore, Md.) SEXUAL DIMORPHISM IN TEETH OF THE FREE-TAILED BAT. J. Mamm. 40(4): 538-541. Nov. 1959.
The upper canines of 400 bats were measured, five distances being recorded. The canines of ♂♂ were decidedly larger in all respects. Also, they were often concave in appearance when viewed from the anterior aspect. This was not true for ♀♀. A probability table is presented giving the chances of a single specimen being of the specified sex with a given upper canine measurement.--Author.

Krutzsch, Philip H., and A. H. Hughes. (U. Pittsburgh Med. Sch., Pittsburgh, Pa.) HEMATOLOGICAL CHANGES WITH TORPOR IN THE BAT. J. Mamm. 40(4): 547-554. Nov. 1959.
Counts of the formed elements of the blood of the bats (Tadarida b. mexicana and Myotis v. incautus) in active and in torpid metabolic states reveal that there is a general decrease in the formed elements in circulating blood of these species during torpor, accompanied by spleenic enlargement. The reduction of formed elements accompanies the generally decreased metabolisms of these animals during torpor and presumably can be tolerated because of correspondingly reduced requirements for anti-inflammatory, clotting, and oxygen-transport mechanisms.--From abst. by P. H. Krutzsch.

Morse, Richard C., and Bryan P. Glass. (Okla. State U., Stillwater.) THE TAXONOMIC STATUS OF ANTROZOUS BUNKERI. J. Mamm. 41(1): 10-15, 2 figs. Feb. 1960.
This bat is reduced in rank, becoming Antrozous pallidus bunkeri (A. b. Hibbard), on the basis of statistical study of various morphometric characters. The variation is on a level usually attributable to subspecies. The known range is extended from Barber County, Kans. to Greer County, Okla.--From abst. by B. P. Glass.

Prokopic, J. A SYSTEMATIC ELABORATION OF PARASITIC WORMS FROM THE MOLE TALPA EUROPAEA L. AND A COMPARISON OF INVASION OF PARASITIC WORMS IN INDIVIDUAL GENERA OF INSECTIVORA IN THE TERRITORY OF CZECHOSLOVAKIA. Zool. Listy 20(4): 331-340, illus. 1957. [From Biol. Abst. 34(5).]
In Czech with German and Russian summ. The material from 52 moles captured in Czechoslovakia showed 9 different types of parasitic worms, 2 species of flukes, 2 species of tapeworms, and 5 species of roundworms, the most abundant parasite being the species Morganiella talpae. Most of the parasitic worms present are in the genus Sorex while the greatest invasion rate occurs with the genus Erinaceus.--From abst. by MDS.

Sadler, W. W., and J. B. Enright. EFFECT OF METABOLIC LEVEL OF THE HOST UPON THE PATHOGENESIS OF RABIES IN THE BAT. J. Infectious Dis. 105(3): 267-273. Nov.-Dec. 1959.
An important aspect in the ecology of rabies. The virus developed slowly in hibernating bats, seemed to reflect the host's metabolic rate more than temperature.--David O'Meara.

Skoczen, Stanislaw. DETERMINATION OF THE SEX OF MOLES (TALPA EUROPAEA L.) BY MEANS OF THEIR EXTERNAL FEATURES. Acta Theriologica, Polska Akad. Nauk (Bialowieza) 2(14): 290-292. May 30, 1959. [From J. Mamm. 41(1), 1960.]

Sulkin, S. E., P. H. Krutzsch, R. Allen, and C. Wallis. STUDIES ON THE PATHOGENESIS OF RABIES IN INSECTIVOROUS BATS. I. ROLE OF BROWN ADIPOSE TISSUE. J. Exp. Med. p. 369-388. Sept. 1959.
The brown adipose tissue may serve as an extraneural site for storage and multiplication of the rabies virus. 50 references.--David O'Meara.

RABBITS AND PIKAS

Adams, Hazel B., and Lowell Adams. (Susanville, Calif.) BLACK-TAILED JACKRABBIT CARCASSES ON THE HIGHWAYS IN NEVADA, IDAHO, AND CALIFORNIA. Ecol. 40(4): 718-720, 1 fig. Oct. 1959.
Based on an August count of carcasses made during a 1,458 mile trip. Sagebrush distribution conformed most nearly with the distribution of carcasses, but for n. Nev., jackrabbit carcasses were associated with Atriplex confertifolia rather than with sagebrush.

Andrewes, C. H., H. V. Thompson, and W. Mansi. (Natl. Inst. Med. Res., London N.W. 7, Eng.) MYXOMATOSIS: PRESENT POSITION AND FUTURE PROSPECTS IN GREAT BRITAIN. Nature 184(4694): 1179-1180. Oct. 1959.
A comparative review of the history of myxomatosis in Britain and Australia. In Britain, the effective vector is a flea; in Australia, myxomatosis is mosquito-borne. Decreased virulence of the virus accompanied with increased resistance of the rabbits is reported for Australia. This is not the case in Britain. Myxomatosis in France may follow the Australian pattern since the important vector is a mosquito.

Clark, Gordon M., Louis N. Locke, and Frederick C. Schmid. (Patuxent Wildl. Res. Cent., Laurel, Md.) CONTACT DERMATITIS INCURRED FROM COTTONTAIL STOMACH CONTENTS. J. Wildl. Mgt. 24(1): 94. Jan. 1960.
Contact dermatitis of the hands incurred from contact with stomach contents of the cottontail rabbit (Sylvilagus floridanus mallurus) is described. It is suggested that this phenomenon was caused by poison ivy in the ingestia.--G. M. Clark.

Dalmat, H. T. ARTHROPOD TRANSMISSION OF RABBIT FIBROMATOSIS (SHOPE). J. Hyg. (Cambridge) 57: 1-30. 1959. [From Vet. Bul: 29(8), #2485.]
Lists experimental vectors and modes of transmission.--David O'Meara.

Fortenbery, Donald K. EVALUATION OF RABBIT MANAGEMENT METHODS BY LIVE TRAPPING. Va. Coop. Wildl. Res. Unit, Release no. 59-8. 4 p. (mimeo.) 1959.
Three cultural treatments established for rabbit management on Camp Pickett were evaluated by live trapping. During fall 1958, rabbit usage ranked as follows: annual mix, clover-winter grain, control, rescue grass. [Paper presented at Va. Acad. Sci. Meeting, Charlottesville, May 8, 1959.]--From abst. by Burd S. McGinnes.

Kirkpatrick, Ralph D. (Rt. 2, Fairmont, Ind.) SAN JUAN RABBIT INVESTIGATION / FINAL REPORT. Ind. Dept. Cons., Div. Fish & Game. iii + 58 p., 1 fig., mimeo. Sept. 1959.
From summ. San Juan rabbits have been propagated by Ind. sportsmen since 1949 despite law prohibiting buying, selling, and trading of wild rabbits. Studies were initiated in 1956 to determine the status of these rabbits in Ind. A partial bibliography on the San Juan rabbit was compiled consisting of 29 pages of references in English. Physiology, reproduction, diseases, mortality, behavior, ecology, damage, and control are treated. Prohibition of importation of San Juans into Ind. is urged. A program of rabbit management, extension, enforcement, and education is recommended.

Lord, Rexford D., Jr. (Ill. Nat. Hist. Surv., Urbana.) COMPARISON OF EARLY MORNING AND SPOTLIGHT ROADSIDE CENSUSES FOR COTTONTAILS. J. Wildl. Mgt. 23(4): 458-460. Oct. 1959.
Studies made during a period of 20 months in cent. Ill. farmland. Comparison of results of the two types of census indicate that for 8 months of the year greater numbers of rabbits are observed when the census is conducted at night. Only the summer months are better for the early morning roadside census.--From auth. abst.

Madson, John. (Olin Mathieson Chem. Corp., East Alton, Ill.) THE COTTONTAIL RABBIT. Olin Mathieson Chem. Corp. 56 p., illus. [Drawings by Maynard Reece. Photos by Charles Schwartz.] 1959.

An attractive and important bulletin which manages to reach the reader for whom it was designed--the rabbit hunter. In "popular style" without being folksy, the author has managed to pack a lot of information on our top game animal. To the casual rabbit hunter, it will be an eye-opener; to the seasoned one, an enlargement of his pleasure. Four chapters cover: Life History; Parasites and Diseases; Conservation and Management; and Rabbit Hunting. Trenchant quotations precede each chapter, and to further one's interest and satisfy the purist, there is a bibliography of 66 references.--F. C. Schmid.

Negus, Norman C. (Dept. Zool., Tulane U., New Orleans.) BREEDING OF SUBADULT COTTONTAIL RABBITS IN OHIO. J. Wildl. Mgt. 23(4): 451-452. Oct. 1959.

Of 67 subadult female cottontail rabbits examined in Ohio between 1952-5, 42% were found to be reproductively active during the breeding season in which they were born. A higher incidence of subadult breeding in 1954 than in 1953 appears related to the fact that adults began breeding much earlier in 1954 than in 1953. It is suggested that rabbits born later than April do not ordinarily attain sexual maturity during their first summer. Apparently sexual maturity is attained more rapidly early in the summer than later.--Auth. abst.

Nieć, L. MYXOMATOSIS OF RABBITS / INFORMATION ABOUT FIRST CASES IN POLAND. Med. Weterynaryjna (Warsaw) 12(8): 464-471, 3 figs. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]

In Polish with Russian summ. Data about enzootics and panzootics of myxomatosis in the period of appearance and spreading of the disease.

Osebold, John W., and David M. Gray. (U. Calif., Davis.) DISSEMINATED STAPHYLOCOCCAL INFECTIONS IN WILD JACK RABBITS (LEPUS CALIFORNICUS). J. Infectious Dis. 106(1): 91-94, 2 figs. Jan.-Feb. 1960.

Three out of 5 wild jack rabbits were found to be experiencing disseminated staphylococcal infections. These animals were collected from an area where a fatal epizootic disease was occurring among jack rabbits.

Peterle, Tony J., and Lee Eberhardt. (Game Div., Dept. Cons., Lansing, Mich.) IS THE LINCOLN INDEX RELIABLE FOR COTTONTAIL CENSUSING? Trans 24th N. Am. Wildl. Conf. p. 261-271, 3 figs. 1959.

Summ: "The decline in the proportion of tagged rabbits in the kill as the hunting season progresses at Michigan's Rose Lake Wildlife Experiment Station, violates one of the assumptions basic to use of the Lincoln Index. We suspect that higher hunting effort in the trapline areas caused this decline." [Other aspects on the reliability of the Index are mentioned but not discussed.]

Reynolds, J. K., and R. H. Stinson. (Dept. Lands & For., Aylmer, Ont.) REPRODUCTION IN THE EUROPEAN HARE IN SOUTHERN ONTARIO. Can. J. Zool. 37(5): 627-631, 3 figs. Oct. 1959.

From abst. Aspects of the reproductive biology and growth of Lepus europaeus hybridus were studied in 1949-52 in sw. Ont. The breeding season began in Jan. and declined in Aug., reaching its height between mid-Feb. and late June when all ♀♀ examined were pregnant. Litter size varied from 1 to 4; an av. of 1.6 fetuses occurred in Jan.-Mar. litters and 3.8 in Apr.-June litters. One young raised in captivity grew to adult weight in 6 months.

Rothschild, Miriam. (Elsfield Manor, Elsfield, Oxford, Eng.) MYXOMATOSIS IN BRITAIN. Nature 185(4708): 257. Jan. 23, 1960.

In the year preceding an outbreak of Myxomatosis, there was 100% infestation rate of fleas on 500 rabbits examined with an average of 70 fleas per rabbit. Survivors 6 months after the epizootic had at most 4-5 fleas and frequently no fleas at all. Three years later both rabbit and flea populations were numerous. "It therefore seems possible that the chief vectors during a big epidemic may be different from those between, or right at the end of a big epizootic. During the period of reduced rabbit and flea population the winged vectors may

well play the major part as agents of dissemination, and if this were so, the avirulent strains of myxomatosis would, between big epizootics, enjoy certain advantages similar to those described for these strains in Australia."

Stone, R. S., R. E. Shope, and D. H. Moore. ELECTRON MICROSCOPE STUDY OF THE DEVELOPMENT OF THE PAPILLOMA VIRUS IN THE SKIN OF THE RABBIT. J. Exp. Med. 110(4): 543-547. Oct. 1959.

N. J. cottontails inoculated with virus from Kans. by skin abrasion. The age of the cell and extent of keratinization can be correlated with the viral development. Excellent plates.--David O'Meara.

Taylor, R. H. (C.S.I.R.O., Wellington, N. Z.) AGE DETERMINATION IN WILD RABBITS. Nature 184(4693): 1158-1159. Oct. 1959.

Four age-groups are recognized based upon the degree of epiphyseal fusion of the tibia and lumbar vertebrae: 1) less than 10 months -- proximal tibial epiphyses unfused; 2) 10-25 months -- tibia fused, all posterior epiphyses of lumbar vertebrae unfused; 3) 26-33 months -- posterior epiphysis of the 7th lumbar vertebra fused, posterior epiphysis of the 6th lumbar vertebra unfused; 4) More than 33 months -- posterior epiphysis of the 6th lumbar vertebra fused. Based upon 47 skeletons of known age rabbits (Oryctolagus cuniculus).

Tenora, F., and V. Baruš. CONTRIBUTION TO THE HELMINTHOFAUNA OF THE WILD RABBITS ORYCTOLAGUS CUNICULUS IN CZECHOSLOVAKIA. Zool. Listy 20(4): 341-357, illus. 1957. [From Biol. Abst. 34(5).]

In Czech with German and Russian summ. Nine different types of parasitic worms were found in the 1956 investigation of the wild rabbits of Czechoslovakia. A difference between the rabbits Oryctolagus cuniculus and Lepus europaeus was found; 1 of the species does not contain the newly named subspecies Mosgovoyia pectinata moravica. The new subspecies is described in tabular form in great detail.--From abst. by MDS.

Toll, J. E., T. S. Baskett, and C. H. Conaway. (Crab Orchard Wildl. Refuge, Carterville, Ill.) HOME RANGE, REPRODUCTION, AND FOODS OF THE SWAMP RABBIT IN MISSOURI. Am. Midl. Nat. 63(2): 398-412, 6 figs. Apr. 1960.

Trap-revealed home ranges were compared with ranges shown by beagle chases. In 6 of 9 chases the range was between that estimated by "trap squares" and "minimum home ranges." Successive chases of the same animal encompassed similar areas. ♀♀ had larger ranges than ♂♂. In the trapping area of 72 acres, which extended from the edge of a shallow impoundment to higher land, there was a gradation from cottontail to swamp rabbit ranges, with a band of overlap. Breeding began in early Feb. Litter sizes were estimated from corpora lutea counts, embryo counts, and placental scar counts. Foods in order of importance were Carex lupulina, blackberry, hazelnut, deciduous holly, and spice bush. Coprophagy occurred during daytime rest periods.--L. F. Stickel.

Wingard, Robert G., and Ward M. Sharp, compilers. (Agr. Educ. Bldg., Pa. State U., University Park.) RABBIT RESEARCH PAYS OFF. Pa. Game News 21 [sic] (1): 13-15, illus. Jan. 1960.

A summarization of data collected on a 90 acre tract of Pa. State University on population and mortality of rabbits during the period 1948-56 inclusive. Harvest by hunting was only slightly more than 3 times the highway kill.

Wodzicki, Kazimierz, and H. S. Roberts. (D.S.I.R., Wellington, N. Z.) INFLUENCE OF POPULATION DENSITY ON THE ADRENAL AND BODY WEIGHTS OF THE WILD RABBIT ORYCTOLAGUS CUNICULUS L. IN NEW ZEALAND. N. Z. J. Sci. 3(1): 103-120, 4 figs. Mar. 1960.

"A total of 523 European wild rabbits from 4 controlled populations ranging from 1 rabbit to 5 acres up to 23 rabbits to the acre, in the North and South Islands of New Zealand, were examined; their sex, age, body and adrenal weights, and the amount of fat were recorded. The season of collection did not affect the body weight. Rabbits from Gore, the South Island, were, however, significantly heavier than those collected from the Wairarapa, in the North Island, at the same season and from populations of similar density. There was no significant difference in fat deposits between these two areas, but in medium and high populations young rabbits had almost as much fat as adult rabbits. Contrary to what obtains for other mammals, male wild rabbits in New Zealand,

like American cottontail rabbits, have relatively heavier adrenals than have females; this characteristic may be peculiar to Lagomorphs. A direct relationship between adrenal weights and population density is demonstrated, but is much less pronounced than in other mammals studied so far. It is shown that with increasing population density the condition, as evinced by fat content, improved. Contrary to what is known of other mammalian species, such as rats or mice, crowding results in an improvement of the condition of the rabbit, especially of the young. It is suggested that a fairly high population density is essential for the welfare of the rabbit."--Authors' summ.

RODENTS--MISCELLANEOUS

Bader, Robert S. (U. Ill., Urbana.) DENTAL PATTERNS IN PEROMYSCUS OF FLORIDA. J. Mamm. 40(4): 600-602. Nov. 1959.

An analysis of the accessory dental structures in 3 species of Peromyscus from Fla. was carried out. The species studied were P. floridanus, P. gossypinus and P. nuttalli. [This supplements the work of Hooper on 17 spp. of Peromyscus. See WR 89: 31.]--Author.

Beer, James R. (U. Minn., St. Paul 1.) A COLLECTION OF DEER MICE FROM OTTER ROCK, OREGON. Murrelet 40(3): 28-29. Sept.-Dec. 1959.

A total of 657 trap stations took 111 deer mice the 1st night and 620 trap stations took 87 deer mice on the 2nd night indicating a very high population density. Sex ratios were grouped by 5 mm. body length classes. Sex ratios of animals under 85 mm. is consistently even; but as the body length increases to between 85 and 90 mm., the sex ratio shifts to one favoring ♂♂. Thereafter, the ♀♀ are more abundant. The preponderence of ♂♂ (66.7%) in the 85-89 mm. class is attributed to behavior pattern; the shift in sex ratios to those favoring ♀♀ is due to differential mortality.

Box, Thadis W. (A. & M. Coll. Tex., College Station.) DENSITY OF PLAINS WOOD RAT DENS ON FOUR PLANT COMMUNITIES IN SOUTH TEXAS. Ecol. 40(4): 715-716. Oct. 1959.

The density of wood rat dens appeared to be closely associated with overhead cover. The greatest density occurred in the prickly pear communities, lesser numbers in the chaparral, dens were essentially lacking in the running mesquite communities, and were absent from the true prairie communities.

Egoscue, Harold J. (Ecol. Res., Dugway, Utah.) LABORATORY AND FIELD STUDIES OF THE NORTHERN GRASSHOPPER MOUSE. J. Mamm. 41(1): 99-110, 2 figs. Feb. 1960.

Onychomys leucogaster was uncommon to rare in the northern Bonneville Basin, Utah, where it was found most frequently in vegetated dunes. Habitats where these mice were captured are described, accompanied by lists of associated small mammals. Females were polyestrous, giving birth to 1-10 litters per year; litters ranged in size from 1-6. With one exception, ♀♀ did not become sexually mature until the year following birth, which is offered as one possible explanation for the apparent scarcity of this mouse. Comparisons are made between the reproductive potentials of this mouse and several other rodents found in w. Utah. Behavior in captivity, ectoparasites, food habits, senses, and mortality factors are discussed.--From auth. abst.

Frank, Fritz. (Biol. Bundesanstalt f. Land- und Forstwirtschaft, Oldenburg, Germany.) ADOPTIONSVERSUCHE BEI FELDMÄUSEN (MICROTUS ARVALIS PALL.) [EXPERIMENTS ON ADOPTION IN FIELD MICE.] Z. Tierpsychol. 9(3): 415-423. 1952. [From Biol. Abst. 35(4).]

In German. Experiments with some 100 adult field mice showed that nesting females would not only immediately retrieve their own young, but also retrieve and adopt strange nestlings of their own and related species. Up to 39 young were brought to the same nest in one case.--From abst. by H. E. Adler.

Golley, Frank B. (U. Ga., Athens.) ANATOMY OF THE DIGESTIVE TRACT OF MICROTUS. J. Mamm. 41(1): 89-99, 2 figs., 1 pl. Feb. 1960.
Gross and histological examination revealed that the digestive tract of Microtus pennsylvanicus was typical of other herbivorous rodents in general. It was concluded that the anatomy of the digestive tract was probably not the causative factor for the observed high digestive efficiency.--From auth. abst.

Hansen, Richard M., and Richard S. Miller. (Colo. State U., Fort Collins.) OBSERVATIONS ON THE PLURAL OCCUPANCY OF POCKET GOPHER BURROW SYSTEMS. J. Mamm. 40(4): 577-584, 2 figs. Nov. 1959.
Plural captures by trapping were recorded for 9 samples during 3 summers (1955-7) for Thomomys talpoides in w. Colo. Of 881 gophers captured, 133 were involved in 63 plural captures in 10 different age-sex combinations. Plural occupancy was observed during the period when gophers were breeding and caring for young. At other times a rigid system of fixed territories persisted and each animal lived in an individual burrow system.--R. M. Hansen.

Howard, Walter E., and Henry E. Childs, Jr. (U. Calif., Davis.) ECOLOGY OF POCKET GOPHERS WITH EMPHASIS ON THOMOMYS BOTTAE MEWA. Hilgardia 29(7): 277-358, [47] figs. Nov. 1959.
From summ. The life history and ecology of the digger pine pocket gopher are here reported. Live trapping on a 3.7 acre study plot for 5 years netted 330 marked individuals 1,798 times. In all more than 1,000 gophers were studied. Body weight is not a reliable indication of age. Males do not live as long as ♀♀, which often live for 3-4 years. Gophers are frequently polygamous. The adult sex ratio of ♂♂ : ♀♀ varied from 1 : 1 to 1 : 4. Females predominated when the population density was high. Home range, territory, dispersal, homing, ecological factors responsible for creating fluctuations in density, soil and forage relationships, effect of burrows, the significance of pocket gophers with respect to animal associates and the importance of gophers to man are discussed.

Ignoffo, Carlo M. (USDA, Brownsville, Texas.) LOUSE POPULATIONS OF SOME RODENTS OF THE GREAT SALT LAKE DESERT. Parasit. 49(3/4): 511-518, 1 fig. Nov. 1959.
From summ. Based on studies of 192 Peromyscus maniculatus sonoriensis, 174 Citellus l. leucurus, and 154 Dipodomys ordii pallidus in 1955-6. Louse-host associations, rate of infestation, frequency of distribution and seasonal fluctuation of louse populations are given. Five species of lice were recovered. Approximately 80% of the rodent sample had less than 25 lice per host. This one-year study revealed that there was some coincidence between rodent activity, temperature and louse populations.

Levine, Norman D. (U. Ill., Urbana.) EIMERIA DICROSTONICUS N. SP., A PROTOZOAN PARASITE OF THE LEMMING, AND OTHER PARASITES FROM ARCTIC RODENTS. Ill. Acad. Sci. Trans. 44: 205-208, 3 figs. 1951.
Eimeria dicrostonicus n. sp. is described from the feces of 5 out of 14 varying lemming from the Canadian Arctic. One oxyurid nematode egg and a single tapeworm egg was found in the lemmings. No parasites retrieved from red-backed mice or the brown lemmings. A review of the forms of Eimeria described from the genus Citellus is included. An unnamed species of coccidium was found in Parry's ground squirrel Citellus parryi.

McKeever, Sturgis. (U. Calif., Davis.) EFFECTS OF REPRODUCTIVE ACTIVITY ON THE WEIGHT OF ADRENAL GLANDS IN MICROTUS MONTANUS. Anat. Rec. 135(1): 1-5, 2 figs. Sept. 1959.
From summ. In natural populations of Microtus montanus, the adrenals of sexually active ♂♂ were significantly smaller than non-active ♂♂; adrenals of active ♀♀ were significantly larger than those of non-active ♀♀. Adrenals of non-active ♂♂ were significantly smaller than non-active ♀♀.

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Panuska, Joseph Allan. (Woodstock College, Md.) WEIGHT PATTERNS AND HIBERNATION IN TAMIAS STRIATUS. J. Mamm. 40(4): 554-566, 3 figs. Nov. 1959.

From Sept. to June of 2 yrs., Tamias striatus from Wis. were gradually exposed to temp. of 1.5°C or 3.0°C. They gained 25% in wt. from Sept. to Jan. and decreased thereafter. The first hibernation followed 1-2 weeks after the wt. peak had been reached and a decline begun. Several weeks of semitorpidity (respiration 20-60 per min.) preceded the first torpor (respiration below 20 per min.). In two experiments, 33% and 18% remained active throughout; 31% and 18% achieved only semitorpor; 26% and 65% became torpid. From data presented, it was concluded that Tamias has an annual wt. cycle and frequently attains deep torpor.--From auth. abst.

Pearson, Oliver P. (Mus. Vert. Zool., U. Calif., Berkeley.) HABITS OF HARVEST MICE REVEALED BY AUTOMATIC PHOTOGRAPHIC RECORDERS. J. Mamm. 41(1): 58-74, 10 figs. Feb. 1960.

Harvest mice (Reithrodontomys megalotis) using meadow mouse (Microtus californicus) runways were automatically photographed by a 16 mm. repeating camera synchronized to an electronic flash; time, temperature, and humidity appeared in each photo. Av. traffic by harvest mice was 2.25 passages per runway per 24 hours. The number of passages was the same on rainy and rainless nights, greater on moonless than on full-moon nights. When the moon set or rose near midnight, activity was increased during the moonlit half of the night. Harvest mice did not avoid runways on nights when they were used by Microtus. Live-trapping resulted in a great increase in traffic. Harvest mice appear in the runways 1/2 hour after sunset and disappear 1/2 hour before sunrise, with a peak of activity early in the evening (except during the summer). The habits of harvest mice are compared with those of Microtus living in the same runways.--From auth. abst.

Pfeiffer, E. W. (Dept. Anat., U. of N. Dak., Grand Forks.) CYCLIC CHANGES IN THE MORPHOLOGY OF THE VULVA AND CLITORIS OF DIPODOMYS. J. Mamm. 41(1): 43-48, 1 pl. Feb. 1960.

Quay, W. B. (U. Calif., Berkeley.) THE REPRODUCTIVE ORGANS OF THE COLLARED LEMMING UNDER DIVERSE TEMPERATURE AND LIGHT CONDITIONS. J. Mamm. 41(1): 74-89, 4 pls. Feb. 1960.

The reproductive organs of 25 collared lemmings, Dicrostonyx torquatus (Rodentia) were studied microscopically after: (1) continuous light and warm, 3-6 months; (2) continuous dark and warm, 4 months; (3) continuous light and cold for up to 36 days; (4) continuous dark and cold for up to 2.5 months; (5) continuous light and heat for 1-4 days following (1). Adult ♂♂ in warm or hot environments have reduced spermatogenesis and ♀♀ in the cold have an anestrous reproductive system with increased ovarian interstitial formation and failure in follicular maturation and growth. Preputial gland parenchymal cytoplasmic content and granulation is greatest in cold-light treated and feral ♂♂; degenerative and resorptive changes are most marked in warm environments and may occur periodically in feral ♀♀.--From auth. abst.

Reynolds, Hudson G. (Mus. Vert. Zool., U. Calif., Berkeley.) LIFE HISTORY OF MERRIAM'S KANGAROO RAT IN SOUTHERN ARIZONA. J. Mamm. 41(1): 48-58, 4 figs., 1 pl. Feb. 1960.

Aspects of behavior, development, reproduction, activity patterns and home range of Dipodomys m. merriami Mearns are discussed. Animals were active throughout the year, exhibiting bimodal, nocturnal activity. Some animals were in breeding condition throughout the year, except for ♀♀ from Nov. through Feb. Litters av. 2.02 (1 to 3) young per ♀. Adult ♂♂ had the larger home ranges, which overlapped those of both sexes, and ♀♀ occupied areas which practically excluded members of like sex during the breeding season.--From auth. abst.

Rudd, R. L. (U. Calif., Davis.) BIOLOGICAL STUDIES OF RODENT PESTS OF AGRICULTURE. Calif. Agr. 14(2): 4. Feb. 1960.

Preliminary, semipopular description of studies now under way in Calif. on the relationship of stress and adrenal glands in pocket gophers and other species. Field and laboratory studies of factors influencing stress are being carried on.

Turček, F. J. DIE WASSERRATTE ALS FORSTSCHÄDLING. [THE WATER VOLE AS A FOREST PEST.] Les (Bratislava) 15(6): 177-179. June 1959. [From Bibliog. Agr. 24(1), 1960.]
In Czech.

Williams, Olwen. (U. Colo., Boulder.) WATER INTAKE IN THE DEER MOUSE. J. Mamm. 40(4): 602-606. Nov. 1959.
The ad libitum consumption of water was recorded intermittently on a weekly basis for a number of deer mice. For animals fed air-dry Purina Chow, the calculated daily intake averaged 3.2 cc. and 4.3 cc. under conditions of high and low humidity respectively. Alteration of dietary protein influenced the quantity of water drunk. The daily intake decreased or increased with a corresponding decrease or increase in protein consumption, but this difference did not persist for more than a few weeks.--Author.

Wing, Elizabeth S. (U. Fla., Gainesville.) REPRODUCTION IN THE POCKET GOPHER IN NORTH-CENTRAL FLORIDA. J. Mamm. 41(1): 35-43, 2 figs. Feb. 1960.
The se. pocket gopher, Geomys pinetis, was studied within a 15-mile radius of Gainesville, Alachua Co., Fla. Three hundred and twenty-five specimens were collected and examined from July 1956 through June 1957. This sample consisted of 134 ♂♂ and 191 ♀♀. The age ratio was 76% adults, 16% subadults, and 8% juveniles. Breeding is apparently continuous throughout the year, although intensified at certain seasons. Greatest reproductive activity in ♂♂ occurred from Jan.-Aug., whereas 2 breeding peaks, March and July-Aug., were evident from data for ♀♀. The mean number of embryos per pregnant ♀ was 1.52 ± 0.11 and the mean number of placental scars per post-partum ♀, 1.73 ± 0.09. An incidence of resorption of at least 10% was indicated. Some ♀♀ were known to have borne at least 2 litters per year.--Auth. abst.

RATTUS AND MUS

Przyborowski, T. RAT POPULATION AT GDYNIA HARBOUR. Biul. Inst. Med. Morskiej In Gdańsk (Gdańsk) 8(1/2): 145-150. 1956 (1957). [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]
In Russian with Polish and English summ. Among others, discussion on the influence of living conditions and migration on the size of rat population.

SCIURIDS

De Coursey, Patricia Jackson. DAILY ACTIVITY RHYTHMS IN THE FLYING SQUIRREL, GLAUCOMYS VOLANS. Ph.D. thesis, U. Wis. 232 p. 1959. [From long abst. in Dissertation Abst. 20(6), Dec. 1959.]
Flying squirrels started daily activity a few minutes after sunset and continued activity interspersed with frequent rest periods until shortly before dawn. The only weather correlated factor at the start or end of activity was a light intensity of about 3 foot candles, suggesting that light was influential in regulating activity.

Fogle, Ned E., and Chad L. Fogle. (U. Ark., Fayetteville.) THE ECOLOGICAL RELATIONSHIP BETWEEN THE OCCURRENCE OF SQUIRREL LEAF-NESTS IN DIFFERENT TYPES OF OAK FOREST HABITATS. Proc. Ark. Acad. Sci. 13: 75-82. 1959.
From summ. A comparison study to determine the correlation between number of squirrel leaf-nests and size and species of trees in 2 different types of mixed oak forests; one in a mesic situation (A) and the other in a xeric type (B). Factors such as densities, frequencies, basal areas, and importance percentages of the trees were compared and it was found that there were more species, they were closer together, and they had a larger over-all basal area in Area A as opposed to Area B. There were approximately twice as many leaf-nests in Area A. Interaction of all conditions rather than any single factor made the difference in the 2 communities.

SCIURIDS--Continued

Habeck, James R. (U. Wis., Madison 6.) TREE-CACHING BEHAVIOR IN THE GRAY SQUIRREL. J. Mamm. 41(1): 125-126. Feb. 1960.
Aerial caching behavior had been observed rather frequently during 4 years near Madison, Wis. Caches are located in uppermost whorls of pine saplings, 2-4 meters from the ground. Sixty-nine percent of buttermuts in 65 fall-tagged trees were removed by the 1st of Jan. and 99% were removed by March 1. This aerial caching is established locally but has not been found generally in Wis.

Münch, Hans. ZUR ÖKOLOGIE UND PSYCHOLOGIE VON MARMOTA M. MARMOTA. [ON THE ECOLOGY AND PSYCHOLOGY OF MARMOTA M. MARMOTA.] Z. Säugetierk. (Berlin) 23 (3-4): 129-138, 13 pl. 1958. [From J. Mamm. 41(1), 1960.]
In German.

Soane, O. A., and E. H. Lennette. NATURALLY ACQUIRED TOXOPLASMOSIS IN THE GRAY SQUIRREL (SCIURUS GRISEUS). J. Lab. & Clin. Med. 53: 163-166. (1959.) [From Vet. Bul., #2073. July 1959.]
Squirrel had bit a child and behaved abnormally but was negative for Negri bodies.--David O'Meara.

Turček, F. J. ZUR NAHRUNG DES EICHHÖRNCHENS--SCIURUS VULGARIS FUSCOATER ALTUM 1876 IN DER SLOWAKEI (CSR). [ON THE FOOD OF SQUIRRELS--SCIURUS VULGARIS FUSCOATER ALTUM 1876 IN CZECHOSLOVAKIA (CSR).] Waldhygiene 3(1/2): 50-53. 1959. [From Bibliog. Agr. 24(2), Feb. 1960.]
In German. "Chiefly seeds of coniferae."

BEAVER

Ingles, Lloyd G. (Fresno State Coll., Fresno, Calif.) TREE CLIMBING BY MOUNTAIN BEAVERS. J. Mamm. 41(1): 120-121, 1 pl. Feb. 1960.
Mountain beavers can and do climb trees, at least up to 20 ft. from the ground, despite statements in the literature to the contrary.

Kebbe, Chester E. (Oreg. State Game Comm.) OREGON'S BEAVER STORY. Oreg. State Game Comm. Bul. 2(15): 3-6, 8 figs. Feb. 1960.
A review of the history of Oreg. beaver and their restoration. The annual harvest ranged from 9,000-15,000 for the period 1951-9.

Patric, Earl F., and William L. Webb. (Syracuse U., Syracuse, N. Y.) AN EVALUATION OF THREE AGE DETERMINATION CRITERIA IN LIVE BEAVERS. J. Wildl. Mgt. 24(1): 37-44, 1 fig. Jan. 1960.
The criteria of weight, product of tail dimensions and zygomatic breadth are all useful for separating live beavers into the four recognized age classes. Data on both weight and tail dimensions are the easiest to obtain, although it is important to consider the season when making age estimates from these measurements. Body weight and tail size do not develop uniformly through the season, but may fluctuate widely depending upon diet, activity, etc. The zygomatic breadth measurement is the most difficult to obtain, but since there is much less variation associated with its use, the season in which measurements are made is of less importance. There is evidence that data on weight and tail dimensions become unreliable for aging old beavers. The zygomatic breadth measurement may be useful for this purpose, although additional research is needed to establish definitely the full value of this criterion.--Authors' abst.

MUSKRAT AND NUTRIA

Bednarik, Karl E. (Magee Marsh Wildl. Area, Oak Harbor, Ohio.) NUTRIA IN THE UNITED STATES WITH MANAGEMENT RECOMMENDATIONS FOR OHIO. Ohio Dept. Nat. Resources, Game Mgt. Publ. no. 165. i + 22 p., 5 figs. Oct. 1958.
Review of the description, habits, native habitat and distribution, and the history of European and U. S. introductions of the nutria. The economic value of the nutria is discussed, and the status of this furbearer by state and region is outlined. Fifteen states report feral nutria populations. Management recommendations for Ohio include: regulation of importation, possession, release and harvest of any exotic wild animals by the appropriate state agency, and the licensing of all fur farms and fur propagators.

Errington, Paul L. (Iowa State Coll., Ames.) WETLAND SAGA. Nat. Hist. 69(3): 8-15, illus. Mar. 1960.
Much of the muskrat portion of the author's OF MEN AND MARSHES (WR 91: 29) has been excerpted to recount the annual cycle of these rodents.

Hoffmeister, Donald F. (Mus. Nat. Hist., U. Ill., Urbana.) THE FUTURE STATUS OF THE NUTRIA, FUR-BEARING RODENT IN ILLINOIS. Trans. Ill. State Acad. Sci. 51(3-4): 48-50. 1958 (1959).
A thorough denunciation of the value of the nutria as an imported addition to the fauna of Ill. This is based on its destruction of the food supply due to overpopulation in the southern states where nutria have become established. They are in direct ecological competition with the muskrat. The nutria's fur is not in demand on the market. The author suggests the banning of nutria importations and fur-farming in Ill. Other states could profit from this warning.--Kenneth L. Williams.

FUR ANIMALS, GENERAL

Krebser, Werner. DIE BESTANDSAUFNAHME DES FISCHOTTERS (LUTRA L. LUTRA) IN DER SCHWEIZ, 1951-1953. [THE INVENTORY OF OTTER (LUTRA L. LUTRA) IN SWITZERLAND, 1951-1953.] Säugetierk. Mitt. 7(2): 67-75. May 1959. [From J. Mamm. 41(1), 1960.]

BEARS

Black, Hugh C., Oliver H. Hewitt, and C. W. Severinghaus. (Dept. Cons., Cornell U., Ithaca, N. Y.) USE OF DRUGS IN HANDLING BLACK BEARS. N. Y. Fish & Game J. 6(2): 179-203, 5 figs. July 1959.
Drugs were used to handle 383 wild black bears during a study to obtain data on movements, weight changes, tooth wear, longevity and reproduction. The principal method was live trapping and tagging. Ether was found to be the most practical and effective drug for anesthetizing bears confined in culvert traps, and was used, by means of an "ether cone," to hold bears for weighing, measuring and tagging immediately following removal from such traps. When it was necessary to hold a bear in anesthesia for a longer period, etherization was followed by an injection of pentobarbital sodium. Succinylcholine chloride, a muscular relaxant, proved effective for immobilizing unrestrained bears so that they could be anesthetized with pentobarbital. It often was necessary to give artificial respiration, and in some cases to administer a respiratory stimulant also, in order to revive anesthetized bears.--Authors' abst.

Clark, Webster K. (Kodiak, Alaska.) KODIAK BEAR-RED SALMON RELATIONSHIPS AT KARLUK LAKE, ALASKA. Trans. 24th N. Am. Wildl. Conf. p. 337-345. 1959.
From summ. Both bear and red salmon, once more plentiful, are valuable wildlife resources and desperately need protection from over-exploitation. Small tributaries of Karluk Lake are used almost solely by about one-half of the early spawners (or about one-third of total escapement). Bear interference is potentially greater on small streams than on the 2 larger systems and littoral areas. Bears are numerous at spawning places soon after spawning begins. Their salmon feeding activity diminishes with ripening of the elderberry crop. Adaptations of salmon (which are discussed) result in relatively small loss of unspawned salmon to bear predation.

Edwards, R. Y., and D. E. Green. (Dept. Recreation & Cons., Victoria, B. C.) THE MEASUREMENT OF TRACKS TO CENSUS GRIZZLY BEARS. Murrelet 40(2): 14-16, 1 fig. May-Aug. 1959.
Description of a technique for the differentiation of individual grizzly bears by track measurements. Fourteen measurements were taken of right front foot prints of grizzly bears in B. C. The investigators concluded after 2 yr. study that the technique has little value in B. C. for estimating populations of grizzlies. Reference is made to Klein [see WR 97: 32] who found that the technique was unreliable in the censusing of brown bears.

BEARS--Continued

Erickson, Albert W. (Cusino Wildl. Exp. Sta., Shingleton, Mich.) THE AGE OF SELF-SUFFICIENCY IN THE BLACK BEAR. J. Wildl. Mgt. 23(4): 401-405. Oct. 1959.

An account of tests made in n. Mich. of the self-sufficiency of 23 cub bears ranging from 5.25 to 8 months. Black bear cubs of either sex may be self-sufficient when as young as 5.5 months and as small as 18 pounds.

MUSTELIDS

Coulter, Malcolm W. (U. Maine, Orono.) THE STATUS AND DISTRIBUTION OF FISHER IN MAINE. J. Mamm. 41(1): 1-9, 1 fig. Feb. 1960.

During the 1930's the fisher (Martes p. pennanti) was found in small numbers in parts of a wilderness area of Maine. The species was protected in 1937. During the mid-1940's it increased, and by 1950 it was common in a 13,000 square mile semiwilderness region. During 1951-7, it continued to increase in numbers and rapidly expanded its range to include an additional 10,000 square miles of varied habitat. Areas of hilly terrain have been occupied more rapidly than sections of flat, low-lying woodland.--From auth. abst.

Ekman, Sven. ÜBER DEN NOREUROPÄISCHEN VIELFRASS (GULO GULO L.). [ON THE NORTHERN EUROPEAN WOLVERINE (GULO GULO L.).] Z. Säugetierk. (Berlin) 23(3-4): 169-181. 1958. [From J. Mamm. 41(1), 1960.]

In German. (With comment by Peter Krott.)

Rausch, Robert. (U. S. Public Health Serv., Anchorage, Alaska.) STUDIES ON THE HELMINTH FAUNA OF ALASKA. XXXVI. PARASITES OF THE WOLVERINE, GULO GULO L., WITH OBSERVATIONS ON THE BIOLOGY OF TAENIA TWITCHELLI SCHWARTZ, 1924. J. Parasit. 45(5): 465-484, illus. 1959. [From Biol. Abst. 35(3).]

Seven species of helminths (viz., Alaria sp., Mesocestoides kirbyi, Taenia twitchelli, Trichinella spiralis, Molineus patens, Ascaris devosi, and Physaloptera torquata) were collected from 80 wolverines autopsied in Alaska. Four species (Alaria sp., M. kirbyi, A. devosi, P. torquata) are recorded for the 1st time from this host and a 5th, Molineus patens, for the 1st time from the wolverine in North America. The life cycle of T. twitchelli was completed experimentally, and the essential natural intermediate host is considered to be the porcupine.--From auth. abst.

DOGS, WOLVES, FOXES

Churcher, Charles S. (U. Toronto, Canada.) THE SPECIFIC STATUS OF THE NEW WORLD RED FOX. J. Mamm. 40(4): 513-520, 1 fig. Nov. 1959.

Cranial variation in North American and Eurasian red foxes was compared. Minor differences only were found between w. European and e. North American specimens, and marked similarity between Alaskan and Siberian specimens was observed. Conclusions: (1) All Holarctic red foxes belonged within a single clinal system of variation around the Arctic and broken by the Atlantic Ocean, (2) all Holarctic red foxes belong to a single species, (3) Vulpes fulva (Desmarest) was a synonym of Vulpes vulpes Linn., as the latter name has priority.--From auth. abst.

Gemmell, M. A. THE FOX AS A DEFINITIVE HOST OF ECHINOCOCCUS AND ITS ROLE IN THE SPREAD OF HYDATID DISEASE. Bul. World Health Org. 20: 87-99. 1959. [From Vet. Bul. 29(7), #2152. July 1959.]

From literature review and experimental infections, it is concluded that red fox plays no role in spread of hydatid disease (E. granulosus) in Australia.--David O'Meara.

Rausch, Robert. (U. S. Public Health Serv., Anchorage, Alaska.) STUDIES ON THE HELMINTH FAUNA OF ALASKA. XXXV. ON THE IDENTITY OF CERTAIN CESTODES (TAENIIDAE) FROM FOXES. Proc. Helminth. Soc. Wash. 26(2): 125-131, illus. 1959. [From Biol. Abst. 35(1).]

Two Holarctic species of Taenia, T. crassiceps and T. polyacantha, commonly parasitize foxes, Alopex lagopus and Vulpes vulpes, in high-boreal regions.--From auth. abst.

Rausch, Robert, and Francis S. L. Williamson. (U. S. Public Health Serv., Anchorage, Alaska.) STUDIES ON THE HELMINTH FAUNA OF ALASKA. XXXIV. THE PARASITES OF WOLVES, CANIS LUPUS L. J. Parasit. 45(4): 395-403, map. 1959. [From Biol. Abst. 34(4).]

Two hundred wolves, Canis lupus, were examined for helminth parasites in Alaska over a period of 10 years. Eight species of helminths were identified: Taenia hydatigena, T. krabbei, T. multiceps, Echinococcus granulosus, Alaria canis, Trichinella spiralis, Uncinaria stenocephala, Toxascaris leonina. Of these, Taenia krabbei and Toxascaris leonina are recorded for the first time from this host in North America. Echinococcus granulosus occurred in 30% of the wolves. Observations on the occurrence, distribution, and natural history of these helminths have been presented. Although both E. granulosus and T. spiralis are pathogenic for man, it is concluded that infected wolves have little importance as a source of human infection.--From abst. by R. L. Rausch.

BIG GAME, GENERAL

Bösener, R. ERMITTLUNGEN ÜBER DIE ERNÄHRUNGSWEISE DES MUFFELWILDES (OVIS MUSIMON SCHREBER 1782). [INVESTIGATIONS UPON THE FEEDING HABITS OF THE MOUFFLON (OVIS MUSIMON SCHREBER 1782).] Arch. f. Forstw. 7(10/11): 874-887. 1958. [From Bibliog. Agr. 24(1), 1960.]

In German with English summ. Forest and agricultural pest.

DESERT BIGHORN COUNCIL, THIRD ANNUAL MEETING, APRIL 7-10, 1959. ii + 88 p., illus., mimeo. 1959. $2.00, paper, spiral bound, from Fred L. Jones, Calif. Dept. Fish & Game, 722 Capitol Ave., Sacramento 14, Calif.

Eighteen papers on the bighorn. Four are concerned with the effects of burro on bighorn; 2 on harvest (Nev. and Calif.); 2 on patrol and protection problems (Ariz. and Calif.); 3 on live trapping and handling; 2 on status; and 1 on life history. Miscellaneous papers include: effects of radioactive fall-out on bighorn, man's effect on bighorn in the San Jacinto-Santa Rosa Mts., recreational values of bighorn additional to hunting, and photographing bighorn. Some highlights: Burros compete with bighorn for water and forage. They usurp small water supplies, destroy pipelines and from their nuisance habits, they are incompatible with both wildlife and domestic stock. Reduction or elimination of burros is indicated rather than water development. In studies on the effects of radioactive fall-out, the strontium units for bighorn were 4.7 compared with 8.5 units for ♂ deer and 8.2 for ♀♀. In Nev., 30 legal rams were taken in 1958 with a hunter success of 38.9%. For Ariz., the harvest was 18 with a 49% hunter success. Trapping at the water holes has been the most successful method for capturing bighorn. The use of drugs for capture has not been satisfactory, but tranquilizers, particularly Sparine, have been helpful in the handling of bighorn. Home made stretchers and semi-dark shipping crates are recommended in transporting captured animals. Fencing of transplant sites for 1-2 years is also recommended.

Grzimek, Michael, and Bernhard Grzimek. (Zool. Gardens, Frankfurt/Main, Germany.) CENSUS OF PLAINS ANIMALS IN THE SERENGETI NATIONAL PARK, TANGANYIKA. J. Wildl. Mgt. 24(1): 27-37, 14 figs. Jan. 1960.

English and German summaries. The number of plains animals were studied in the 4,600 sq. mile Serengeti Natl. Park in British East Africa. In an aerial census, the total counts were 194,654 Thomson's and Grant's gazelles; 99,481 wildebeest; 57,199 zebra; 5,172 topi; 2,452 eland; 1,813 buffalo; 1,285 kingoni; 60 elephant; 57 roan antelope; 55 rhinoceros; 1,707 impala; 837 giraffe; 284 waterbuck; 178 stork; 115 oryx; 1,621 ostrich. The total was 366,980 large animals, one-third of the figure which earlier had been estimated for this region. These animals presumably are the last large concentrations of plains animals in Africa. A considerable number of the animals were found outside of the park. A far greater number will be outside of the park on the basis of contemplated future boundaries. The reactions of different species to the aircraft are described.--From abst. by Bernhard Grzimek.

Jaczewski, Zbigniew, and Mieczyslaw Czaja. (Popielno, p-ta Wejsuny, District Pisz, Poland.) THE EFFECT OF TUBOCURARINE CHLORIDE ON THE RED DEER, CERVUS ELAPHUS (L.). Trans. 24th N. Am. Wildl. Conf. p. 408-413. 1959.
Three red deer does and 7 red deer stags received injections of tubocurarine chloride. Symptoms of drug action are described in detail. Dose required depends on several factors, and also on the behavior of the animal.--From abst. by Zbigniew Jaczewski.

Pimlott, Douglas H. (Ont. Dept. Lands & For., Maple.) MOOSE HARVESTS IN NEWFOUNDLAND AND FENNOSCANDIAN COUNTRIES. Trans. 24th N. Am. Wildl. Conf. p. 422-447. 1959.
Material from the moose harvest phase of Pimlott's Ph.D. thesis. [See WR 97: 39.]

Pimlott, Douglas H. (Ont. Dept. Lands & For., Maple.) REPRODUCTION AND PRODUCTIVITY OF NEWFOUNDLAND MOOSE. J. Wildl. Mgt. 23(4): 381-401, 1 fig. Oct. 1959.
This complements the above paper by giving the reproduction and productivity phase of author's thesis entitled: Reproduction, productivity and harvests of Newfoundland moose.

Riney, Thane. (Natl. Mus., Bulawayo, S. Rhodesia.) A FIELD TECHNIQUE FOR ASSESSING PHYSICAL CONDITION OF SOME UNGULATES. J. Wildl. Mgt. 24(1): 92-94, 1 fig. Jan. 1960.
A field technique is described for recording the condition of live deer and several other ungulates. Based on defined changes in increasing thinness of the animal as its condition drops, each animal classified is arbitrarily placed in one of three condition classes--good, fair, or poor--and the evidence presented as the proportion of animals in each condition class at a given locality in a given season. The technique has proven useful in N. Z. and in Africa, and is suggested for use with ungulates of body conformation similar to deer and antelope; and in situations where it is impractical to kill or trap a sample of the population to assess condition.--From auth. abst.

Robel, Robert J. (Utah Coop. Wildl. Res. Unit, Utah State U., Logan.) DETERMINING ELK MOVEMENTS THROUGH PERIODIC AERIAL COUNTS. J. Wildl. Mgt. 24 (1): 103-104. Jan. 1960.
Periodic aerial counts were used to obtain data relating to elk movements in the Selway River District of Idaho. The number of elk sighted in each sample section was used as an index to population concentrations. Shifts in elk populations were easily detected in this manner. The technique was considered to be of value in obtaining elk migration information.--Auth. abst.

Shoho, Chusaburo. (Nakayama-Soen Takarazuka Hyogo-Ken, Japan.) DIE SETARIEN VON SCHWEIZERISCHEN REH, CAPREOLUS CAPREOLUS. [THE SETARIA OF THE SWISS DEER, CAPREOLUS CAPREOLUS.] Rev. Suisse Zool. 66(1): 233-258, 7 figs. 1959.
Host specificity and differential diagnostic criteria between bovid and cervid setaria are discussed. Diagnostic figures are given for 4 species. Specimens of Setaria tundra from C. capreolus differ sufficiently from those of Rangifer rangifer to be considered S. t. capreolus, which is described with figures.--R. M. Chew.

Skjenneberg, S. EKINOKOKKOSE HOS REIN I KANTOKEINO. [ECHINOCOCCUS INFESTATION OF REINDEER IN NORTHERN NORWAY.] Nord. Vet. Med. 11: 110-123. 1959. [From Vet. Bul., Nov. 1959.]
English summ. Echinococcus cysts were found in 9.6% of 2,204 reindeer's lungs on slaughter.--David O'Meara.

Taber, Richard D. (Mont. State U., Missoula.) DEVELOPMENT OF THE CERVID ANTLER AS AN INDEX OF LATE WINTER PHYSICAL CONDITION. Mont. Acad. Sci. 18: 27-28. 1958.
Mont. has initiated studies of antlers of yearling mule deer and elk. These studies conducted during the hunting season complement Pa. penned deer studies and are designed to reflect dietary level of the animals in the previous winter.

Troyer, Willard A. (Kodiak Natl. Wildl. Refuge, Kodiak, Alaska.) THE ROOSEVELT ELK ON AFOGNAK ISLAND, ALASKA. J. Wildl. Mgt. 24(1): 15-21, 1 fig. Jan. 1960.

In 1929, 5 ♀ and 3 ♂ Roosevelt elk were introduced on Afognak Is. They have increased to an estimated 800 animals. Primary winter browse plants utilized are willow and elderberry. Elderberry leaves, fireweed (Epilobium angustifolium) and grasses are the important summer foods. The elk remain in large herds of 100 - 140 animals and fail to break up into small harems during the rut, which peaks the last two weeks of Sept. Calves are born in late May-early June. Field dressed weights range from 411 pounds in yearlings to 1,094 in adult ♂♂. The annual kill has increased from 26 (first open hunting season) in 1950 to 111 in 1958.--From auth abst.

Westman, Hans. ÄLGENS SKADEGÖRELSE PÅ UNGSKOGEN. [THE DAMAGE CAUSED BY ELK TO YOUNG FOREST STANDS.] K. Skoghögskolans Skrift. 28. 1-148 p., illus. 1958. [From Biol. Abst. 34(4).]

In Swedish with English and German summ. The study is concerned with the comparative supply of elk forage, the grazing habits of the animal, and the damage it causes to forests. Methods to control elk damage are suggested.--From abst. by H. Harris.

Wright, Bruce S. (U. of N. B., Fredericton.) PREDATION ON BIG GAME IN EAST AFRICA. J. Wildl. Mgt. 24(1): 1-15. Jan. 1960.

The food habits of lions, leopards, wild dogs, cheetahs, and other predators in s. Kenya and cent. Tanganyika were studied in a sample of 161 kills. The Thomson's gazelle was found to be the most widely used prey animal by the carnivora of the region, followed in order by the impala, the wildebeest, and the zebra. The lions were found to be living mainly on wildebeest, zebra, and Thomson's gazelle in that order. The predators were found to be killing more ♂♂ than ♀♀, and more old than young animals. The annual range of one pride of lions was 33 sq. miles. Mortality factors among young lions were competition for food and drowning. Nightly hunts might cover as much as 10,000 yards. The large predators were found to have a rate of food provision of 1-1.5 pounds of food per day per 10 pounds of predator. The massing of native's cattle for protection against predators was a major factor in causing soil erosion by overgrazing.--From auth. abst.

DEER (Odocoileus)

Adams, William Hensley, Jr. (Rt. 2, Madisonville, Tenn.) POPULATION ECOLOGY AND MANAGEMENT OF WHITE-TAILED DEER IN THE CHOCCOLOCCO WILDLIFE MANAGEMENT AREA, ALABAMA. Ph.D. thesis, Ala. Poly. Inst. 117 p. 1959.

The basic ecology of a white-tailed deer population was investigated on the 40,000-acre Choccolocco Wildlife Management Area in ne. Ala. during 1956-9. Deer were apparently exterminated from this region during the early 1900's. Approximately 65 deer were released in the Area between 1938 and 1941. A total of 898 legal bucks has been removed during twelve successive seasons of hunting since 1948. Studies of range condition, hunting records, sex and age ratios, deer reproduction, and food habits were made. Range deterioration was correlated with increased numbers of spike bucks, does with single embryos after initial pregnancy and deer in poor physical condition. On an annual basis, Vaccinium vacillans was the most important browse species, but seasonally, other items such as acorns, fungi, lichens and litter assumed prominence. Litter appeared in inverse ratio to the amount of live forage available during the winter season. Low fertility and an overbrowsed range have resulted in low carrying capacity. Previous management practices have failed to remove annual deer surpluses. This has resulted in a deer population in excess of the present carrying capacity of about 2,000 deer. Either-sex hunting on the Choccolocco Area is recommended in order to remove excess deer before range damage becomes permanent or mass deer die-offs possibly result.--From auth. abst.

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Barick, Frank. (N. C. Wildl. Res. Comm., Raleigh.) TWELVE YEARS OF DEER HUNTING RECORDS. Wildl. in N. C. 24(3): 8-10, illus. Mar. 1960.
The deer kill on the N. C. management areas has increased 5-fold in ten years to a record high of 1,891. Underhunting is indicated despite the fact that there were "doe" seasons on 5 of the 16 management areas open to hunting.

Beals, E. W., G. Cottam, and R. J. Vogl. (U. Wis., Madison.) INFLUENCE OF DEER ON VEGETATION OF THE APOSTLE ISLANDS, WISCONSIN. J. Wildl. Mgt. 24(1): 68-80, 5 figs. Jan. 1960.
Seventy-six representative stands of forest vegetation were sampled for browse stems by the point-centered quarter method. Browse damage by white-tailed deer was also recorded. Indices were calculated for browse pressure based on damage, palatability, and density of browse. Taxus canadensis and Thuja occidentalis decrease in density with increased browse pressure, while Acer spicatum tends to increase with light or moderate pressure. The best habitat for deer appears to be forests with dominant trees Betula lutea and Thuja occidentalis, but when these stands are subjected to moderate or heavy browsing their food value diminishes rapidly.--From abst. by E. W. Beals.

Dyk, V. CYSTICERKOSA SRNČI ZVĚŘE V EKOLOGICKEM PROFILU. Sborn. Vysoké Sk. Zemedel. a Lesnické V Brně. Rad. B Spisy Fakul. Vet. 6(4): 259-264. 1958. [From review in Helminth. Abst. 27(3/4).]
In Czech with German and Russian summ. A discussion of the ecology of cysticerciasis in roe deer. Twelve of 150 ♂♂ were found infected with Cysticercus tenuicollis whereas only 1 of 51 ♀♀ carried the infection. The difference in incidence of infection in the sexes is attributed to the fact ♂♂ keep to places frequented by dogs and foxes.

Forbes, Stanley E. (432 Lookout Ave., Ridgeway, Pa.) THE PENNSYLVANIA DEER STORY -- 1959. Pa. Game News 30(11): 13-17, 2 figs. Nov. 1959.
Weight, measurement and age information on deer of both sexes; herd productivity and range condition for Pa. (1958 season). The number of fawns per breeding fawn was 1.0, for adults 1.6. The sex ratio of fetuses was 140 ♂♂ : 100 ♀♀. The estimated 1959 fall population is in excess of 500,000 deer. Beech-birch-maple forest type within oak-hickory type was seriously overbrowsed while surrounding oak-hickory showed very light utilization.

French, C. E., L. C. McEwen, N. D. Magruder, Terry Rader, T. A. Long, and R. W. Swift. (Dept. Anim. Nutrition, Pa. State U., University Park.) RESPONSES OF WHITE-TAILED BUCKS TO ADDED ARTIFICIAL LIGHT. J. Mamm. 41(1): 23-29, 2 figs. Feb. 1960.
Maintaining 16 hours of light daily by artificial supplementation of daylight ameloriated the severe winter decrease in food consumption and body weight loss, advanced by approximately two weeks the dates of onset of rut, pelage change, and maturing and shedding of antlers as compared to deer exposed to normal hours of daylight. The final antler size attained was nearly identical for both groups.--R. W. Swift.

Goodwin, Harry. THE DEER OF NEW JERSEY. N. J. Outdoors 10(7): 4-9, illus. Jan. 1960.
An account of the restoration of deer in N. J. By 1901 the legal kill was less than 24 deer, and since 1957 the annual legal kill has exceeded 7,000.

Habeck, James Robert. THE ECOLOGY OF WHITE CEDAR SWAMPS IN NORTHERN WISCONSIN WITH SPECIAL ATTENTION TO THEIR ROLE AS WINTER DEER RANGE. Ph.D. thesis, U. Wis. 53 p. 1959. [From long abst. in Dissertation Abst. 20(6), Dec. 1959.]
A detailed study was made on the influence that winter deer activity exerts on the physical environment and the botanical composition of cedar swamps. Winter deer activity tends to create more mesic conditions which in turn results in poor winter range. Deer browsing has curtailed white cedar reproduction in lowland swamps in n. Wis. In exclosure studies, 2 artificial methods of vegetative reproduction were tested, the use of cedar cuttings treated with and without growth hormones, and the tipping of entire cedar trees. A low percentage of the cuttings were successful in establishing

themselves, while a high percentage of trees artificially tipped were successfully established. Genetic variations of white cedars were investigated and an upland white cedar ecotype was discovered which would be preferred for reforestation programs.

Hamilton, Rex. (R.R. 2, Montgomery, Ind.) REPORT: 1959 DEER SEASON. Outdoor Ind. 3(8): 25-26. Feb. 1960.
The Indiana deer kill has risen from 83 in 1953 to 799 in 1959. Hunter success has increased from 1.3% to 9.1% during the period.

Klein, David R., and Sigurd T. Olson. (Zool. Dept., U. of B. C., Vancouver.) NATURAL MORTALITY PATTERNS OF DEER IN SOUTHEAST ALASKA. J. Wildl. Mgt. 24(1): 80-88, 1 fig. Jan. 1960.
Results of deer (Odocoileus hemionus sitkensis) winter mortality surveys from 1952-6 indicate that starvation accounted for the greater losses. Predation and accidents represented 20% of the natural mortality. Highest mortality from starvation was associated with poor range conditions and overstocked range. Mortality rates were highest among the youngest and oldest age classes; fawns represented 56%, adults less than 5 years -- 8%, and deer over 5 years -- 36%. Sex ratios in the mortality were 167 ♂♂ : 100 ♀♀ (72 deer) for adults less than 5 years, and 72 ♂♂ : 100 ♀♀ (127 deer) for deer over 5 years. Sex variations in the mortality are believed to be the result of differential sex mortality, heavier on ♂♂ than ♀♀, acting throughout life and the product of losses from hunting pressure, starvation, predation and accidents.--Auth. abst.

Long, T. A., R. L. Cowan, C. W. Wolfe, Terry Rader, and R. W. Swift. (Pa. State U., University Park.) EFFECT OF SEASONAL FEED RESTRICTION ON ANTLER DEVELOPMENT OF WHITE-TAILED DEER. Pa. State U. Agr. Exp. Sta., Prog. Rep. 209. i + 11 p., 5 figs. Sept. 1959.
"Eighteen yearling, male White-tailed deer were used in an experiment designed to determine the effect of short term feed restriction on antler development, pelage change, body weight, and subsequent feed consumption. Restriction of feed intake over 5-and 10-week periods delayed antler development, pelage change, and decreased time required for rub-out and shedding of antlers each by about one day for each week of feed restriction. Average body weights of the control deer and the 5-week restricted deer were very similar at the close of the experiment. However, the 10-week restricted group never attained the average body weight of the other two groups."

Loveless, Charles M. (Colo. Coop. Wildl. Res. Unit, Fort Collins, Colo.) THE EVERGLADES DEER HERD / LIFE HISTORY AND MANAGEMENT. Fla. Game & Fresh Water Fish Comm., Tech. Bul. no. 6. x + 11-104 p., 26 figs. 1959.
From long summ. Studies conducted during 1955-9 on the ecology of everglades deer in the 725,300-acre Everglades Wildlife Management Area. "Discussions of climate, vegetation, hydrology, fire, alligator holes, food supply and forage quality, harvest and hunting pressure stress the relationships between these factors and the deer herd. Breeding activity in Everglades deer occurs throughout the year, but is most pronounced during September--60% of the fawns are dropped in March-April. Average annual production is about 30% of winter population. Aerial census and estimates based on total buck kill indicated a population density for the 2,000 sq. mile range of about 7,000 to 8,000 deer. Collected information shows a marked difference in food preference between bucks, and does and young. Adult ♂♂ feed principally on aquatic plants, while ♀♀ and young prefer tree shrubs and mesophytic herbaceous plants. Hunting and hunting pressure are principally functions of accessibility which is in turn dependent on prevailing water levels. The most important management consideration is that which is concerned with proper water level regulation."

Loveless, Charles M., and Frank J. Ligas. (Colo. Coop. Wildl. Res. Unit, Fort Collins.) RANGE CONDITIONS, LIFE HISTORY AND FOOD HABITS OF THE EVERGLADES DEER HERD. Trans. 24th N. Am. Wildl. Conf. p. 201-215, 1 fig. 1959.
See above for a review of a technical bulletin by Loveless which covers this material more fully.

Lueth, Francis X. (Box 415, Centreville, Ala.) ALABAMA HAS DEER; ALSO HAS PROBLEMS! Ala. Cons. 31(3): 8-9. Oct.-Nov. 1959.
Presents av. weights by age class for 4 Ala. areas for the period 1953-58 and legal kill for 3 Ala. management areas for 1948-58. Harvesting of spike bucks was first permitted in 1955. In all cases, more forked antlered animals were taken in the fourth season after spikes were permitted than in any time prior to 1955.

McNeel, Wakelin, Jr., and John Kennedy. (Cent. Mich. U., Mt. Pleasant.) PREVENTION OF BROWSING BY DEER IN A PINE PLANTATION. J. Wildl. Mgt. 23(4): 450-451, 1 fig. Oct. 1959.
A method to cope with serious fall and winter deer browse damage in a young pine plantation in Cent. Mich. was developed. Light weight polyethylene plastic pieces, 3" x 4", stapled over the buds in the fall gave complete protection at a cost of less than 1/5 cent per tree. Terminal buds of 200 trees can be covered in an hour by 2 men, where tree spacing is approximately 8 feet apart. Buds on unprotected trees were eaten in many cases, resulting in deformed trees and setting back growth.--From authors' abst.

Quillen, John H., Jr. THE EFFECT OF FORESTRY PRACTICES AND WILDLIFE MANAGEMENT ON ABUNDANCE AND DISTRIBUTION OF DEER. Va. Coop. Wildl. Res. Unit Release no. 59-9. 4 p. (mimeo.) 1959.
A progress report on the initial phase of a 10-year forestry-wildlife management study. Early observations indicate that the distribution of deer on the study area is effected by the habitat manipulation. [Paper presented at Va. Acad. Sci. Meeting, Charlottesville, May 8, 1959.]--Burd S. McGinnes.

Ruhl, Harry D. (Mich. Dept. Cons., Lansing.) BIG GAME MANAGEMENT IN THE LAKE STATES. Trans. 24th N. Am. Wildl. Conf. p. 472-479. 1959.
Harvesting mechanics should be geared to the hunting traditions, the number and distribution of hunters, and the relative size of the deer herd. A simple system of any-deer seasons with varying lengths and opening dates may be adequate for lightly hunted areas, but more control is desirable in accessible, heavily hunted country. A quota and area system for taking extra antlerless deer appears workable. The expanding deer population in agricultural-industrial areas will be limited by public tolerance to deer damage to farm and garden products, car collisions, and losses because of poaching, dog, fence, and other human activities. Disease relationships between deer and domestic stock are important aspects of big game management.--From auth. abst.

Severinghaus, C. W., and Rosalind Gottlieb. (Wildl. Res. Lab., Delmar, N. Y.) BIG DEER VS LITTLE DEER / FOOD IS THE KEY FACTOR. N. Y. State Cons. 14(2): 30-31, 2 figs. Oct.-Nov. 1959.
Age for age, there is about a 20-pound difference in favor of w. N. Y. ♂♂ over Adirondack ♂♂. For ♀♀ the weight differential is even more pronounced, averaging a little more than 20 pounds more for the w. N. Y. does. Western N. Y. has a good deer range which has been maintained in this condition by antlerless deer seasons. In contrast, the Adirondacks has an overpopulation of deer. Average deer weights by age classes and sex are graphed for the two areas.

Shope, R. E., R. Mangold, R. MacNamara, L. G. and K. R. Dumbell. (Rockefeller Inst., New York City.) AN INFECTIOUS CUTANEOUS FIBROMA OF THE VIRGINIA WHITE-TAILED DEER (ODOCOILEUS VIRGINIANUS). J. Exp. Med. 108: 797-802. 1958.
The N. J. strain may be identical with the Wis., Va., Calif., and Vt. strains. Experimental infections between deer to rabbits, sheep, and cattle, and cattle to deer failed.--David O'Meara.

Silver, Helenette, N. F. Colovos, and Haven H. Hayes. (N. H. Fish & Game Dept., Concord.) BASAL METABOLISM OF WHITE-TAILED DEER--A PILOT STUDY. J. Wildl. Mgt. 23(4): 434-438. Oct. 1959.

Basal metabolic rate (BMR) of 4 northern white-tailed deer (Odocoileus virginianus borealis) was measured with the objective of providing a base for estimating nutritional requirements under varying stress. Animals were adults (2 ♂♂, 2 ♀♀) conditioned to test procedure. Values obtained ($W^{0.73}$) were: for the ♂♂, 48.9 and 48.5, respectively; for the ♀♀, 46.0 and 50.7. Both ♀♀ were pregnant; the higher value was obtained for a doe well advanced in pregnancy. Av. BMR of 48.5 ($W^{0.73}$) was similar to that of sheep. BMR was not higher in Feb. than in June, suggesting that change of coat, and other factors, compensate for environmental temperature within the range encountered, and that critical temperature for the species is below 0°C.--From abst. by Helenette Silver.

Smith, Arthur D. (Utah State U., Logan.) ADEQUACY OF SOME IMPORTANT BROWSE SPECIES IN OVERWINTERING OF MULE DEER. J. Range Mgt. 12(1): 8-13, illus. 1959. [From Biol. Abst. 35(1).]

Mule deer were fed prescribed diets of sagebrush (Artemisia tridentata), juniper (Juniperus osteosperma), and oak (Quercus gambelii). For comparison, mixed diets of these and other more palatable browse species were fed. Animals were removed from feeding tests when their condition indicated further testing to be unwise. The mean duration of tests for each was: sagebrush--36 days, juniper--41 days, and oak--60 days. Forage intakes were in the same order, being 0.42, 0.78, and 2.25 lbs./cwt. for sagebrush, juniper, and oak, respectively. Combining sagebrush and juniper increased the total forage intake to about the sum of the mean values when fed alone. Except for oak, the forage intake levels were materially less than was observed on mixed diets involving more palatable species. Certain animals consumed more sagebrush when this species was given in combination with other forages than did those animals receiving it alone. Similar observations were recorded with other animals getting juniper. Oak consumption, in combination with other browse plants, was low. The studies suggest that, in combination with other plants, sagebrush and juniper are important and desired winter forage for mule deer. When they are consumed alone, forage consumption may be less than adequate for maintenance. --Author.

Trainer, Daniel O., Jr., and R. P. Hanson. (Wis. Cons. Dept., Madison.) LEPTOSPIROSIS AND BRUCELLOSIS SEROLOGICAL REACTORS IN WISCONSIN DEER, 1957-1958. J. Wildl. Mgt. 24(1): 44-52, 1 fig. Jan. 1960.

Approximately 600 white-tailed deer serum samples were collected from various sections of Wis. for serological study. From this sample only one reactor to brucellosis (Brucella abortus) was detected. From these results and reports of other investigators, it appears that brucellosis in not an important disease in white-tailed deer. Leptospirosis reactors were found in deer from all areas with heavy deer populations. The average titer of reactors was 1:1,000, and the test antigen was Leptospira pomona. The number of leptospirosis reactors was greater among adult deer than among fawns. A higher prevalence of reactors was found in adult ♂♂ than in adult ♀♀, but among fawns positive titers were found only in ♀♀. The tissue predilection of the disease in other species, the apparent age and sex prevalence of the disease in deer and the sexual behavior of deer fit the hypothesis that leptospirosis transmission among deer is promoted during the rut. This mode of transmission could help explain the apparent independence of the disease in deer and cattle populations, and the occurrence of the disease in whichever of the two species is present in greatest numbers in an area, irrespective of the occurrence of the disease in the other species.--From abst. by D. O. Trainer, Jr.

Tyson, Edwin L. (Fla. Game & Fresh Water Fish Comm., Tallahassee.) A DEER DRIVE VS. TRACK CENSUS. Trans. 24th N. Am. Wildl. Conf. p. 457-464. 1959.

A comparison of the track count census with a drive type deer census. No differences at the 95% level were apparent, however. The track count indicated a few more deer. Terrain and methods are discussed briefly. The reasoning behind the track census is reviewed.--From auth. abst.

DEER (Odocoileus)--Continued

Verme, L. J., L. D. Fay, and U. V. Mostosky. (Cusino Wildl. Exp. Sta., Shingleton, Mich.) USE OF RADIOGRAPHY (X-RAY) IN DEER PRODUCTIVITY STUDIES. Mich. Dept. Cons. Game Div. Rep. no. 2253. 7 p., 2 figs. Dec. 1959.
Based upon the findings of x-raying 36 deer, 17 dead and 19 alive, for stage of gestation. Pregnancy and number of young can be determined in live deer from the mid-point (100th day) of gestation onward. Fetal counts may be reasonably valid as early as the 66th day. Precautions in the use of radiography are discussed.

Webb, William L. (State U. Coll For., Syracuse U., Syracuse 10, N. Y.) SUMMER BROWSE PREFERENCE OF ADIRONDACK WHITE-TAILED DEER. J. Wildl. Mgt. 23 (4): 455-457. Oct. 1959.
Evaluation of white-tailed deer summer browse preference was made in an exclosure which had not been open to deer for 18 years. It was evident from 2 deer-days use that alternate-leaved dogwood and elderberry were two highly preferred species. All other woody species of the northern hardwood forest type were lightly used or unused. Herbaceous species were not used.--From auth. abst.

White, Keith L. (U. Wis., Madison.) NOTES ON USE OF CLOVER ONE-SHOT DEER MARKER. J. Wildl. Mgt. 24(1): 102. Jan. 1960.
The best sealing compound tried was ordinary vaseline; the best marking liquid tried was aluminum paint. Moving markers after successful firings circumvented the apparent learned behavior of deer in avoiding previously fired markers. [This paper supplements that of Clover on deer marking devices. See WR 76: 51.]--Auth. abst.

Youatt, W. G., and L. D. Fay. (Rose Lake Wildl. Exp. Sta., E. Lansing, Mich.) EXPERIMENTAL BRUCELLOSIS IN WHITE-TAILED DEER. Am. J. Vet. Res. 20 (78): 925-926, 2 figs. Sept. 1959.
From summ. White-tailed deer will develop and maintain a demonstrable titer to Brucella abortus. Although it is possible to infect deer with B. abortus experimentally, it is not known if they are as susceptible as cattle to infection in the natural state. Vaccinated fawns show an antibody response typical of that found in vaccinated calves.

MAMMALS--MARINE

Bartholomew, George A. (U. Calif., Los Angeles.) MOTHER-YOUNG RELATIONS AND THE MATURATION OF PUP BEHAVIOUR IN THE ALASKA FUR SEAL. Anim. Behaviour 7 (3-4): 163-171. July-Oct. 1959.
From summ. "Parental attention of Alaska fur seals is minimal. The bulls ignore the pups. The cows rebuff all pups but their own. In the first hours after giving birth, the ♀ will retrieve her pup if it is displaced and also will carry it in her mouth away from danger or disturbance. She threatens and bites other ♀♀ that disturb her or her pup. This attentive and protective behaviour is confined exclusively to the few days between parturition and oestrus and is conspicuous only for a period of a few hours to a day post partum." Gregariousness, wandering and play in the pup is described, and in the discussion the fur seal is fitted into "the spectrum for mammalian social behaviour"--which it extends appreciably.

Brown, S. G. WHALES OBSERVED IN THE ATLANTIC OCEAN, NOTES ON THEIR DISTRIBUTION. Norsk Hval.-Tid. (Norwegian Whaling Gazette) 48(6): 289-308. June 1959. [From J. Mamm. 41(1), 1960.]

Csordas, S. E. (Antarctic Div., Dept. External Affairs, Melbourne.) BREEDING OF THE FUR SEAL, ARCTOCEPHALUS FORSTERI LESSON, AT MACQUARIE ISLAND. Australian J. Sci. 21(3): 87-88. 1958. [From Biol. Abst. 35(2).]

Holm, John L., and Åge Jonsgård. OCCURRENCE OF THE SPERM WHALE IN THE ANTARCTIC AND THE POSSIBLE INFLUENCE OF THE MOON. Norsk Hval.-Tid. (Norwegian Whaling Gazette) 48(4): 161-182. Apr. 1959. [From J. Mamm. 41(1), 1960.]

Mathisen, Ole A. (U. Wash., Seattle 5.) STUDIES ON STELLER SEA LION (EUMETOPIAS JUBATA) IN ALASKA. Trans. 24th N. Am. Wildl. Conf. p. 346-356, 4 figs. 1959.

Aerial photographic census of the rookeries of the Steller sea lion in cent. and w. Alaska during the years 1956-8, supplemented by other information for the remaining part of the Pacific Coast, indicated a total population of about 170,000 animals. The existing evidence of damage by this population to commercially important food fishes through predation is reviewed. Reduction of the population through commercial utilization for animal food is advocated. Harvest is recommended during the breeding season when the majority of the sea lions remain relatively stationary on the rookeries and show less wariness to hunting operations.--From auth. abst.

Piazza, Alvaro A. LOS LOBOS MARINOS EN EL PERU. [PINNIPEDS IN PERÚ.] Caza y Pesca (Lima) no. 9. p. 1-29. 1959.

Northern limit of pinnipeds on Peruvian coast 4°10' S; a few thousand sea lions Otaria remain in Peruvian waters but only 40 southern fur seals Arctocephalus were seen by the author. Complete protection for Peruvian pinnipeds for an indefinite number of years is recommended.--Victor B. Scheffer.

Pike, G. C. (Fisheries Res. Bd. Canada Biol. Sta., Nanaimo, B. C.) FOOD OF THE NORTHERN SEA LION. Fisheries Res. Bd. Canada Pac. Prog. Reps. 112: 18-20. 1958. [From Biol. Abst. 35(5).]

Stomachs of 81 sea lions Eumetopias jubata from British Columbia showed 62 empty. Squid, unidentified fish, herring, rockfish, and octopus each occurred in 3 or more stomachs. Salmon, skate, and hake were each found once. Major movements are described, and a condensed summary of earlier results is provided. --J. L. Hart.

Scott, Robert F., Karl W. Kenyon, John L. Buckley, and Sigurd T. Olson. (US F&WS, College, Alaska.) STATUS AND MANAGEMENT OF THE POLAR BEAR AND PACIFIC WALRUS. Trans. 24th N. Am. Wildl. Conf. p. 366-374. 1959.

The polar bear is probably thinly distributed over the entire Arctic basin, but with greatest densities on the periphery. Annual harvest figures give the best index of population status. Present annual harvest is on the order of 1,000. Norway and Greenland each report between 150 and 300, Canada 400-500, Alaska 100-200, and the U.S.S.R. 100-150. Trophy hunters kill about 2/3 of the Alaskan bears and 30 of the Norwegian. Aerial observations off Alaska indicate no decline in bear numbers. Declines are reported by Greenland and the U.S.S.R. The status of the Pacific walrus is more alarming. Only an estimated 45,000 survive of the 200,000 present a century ago. Current kill by the U. S. and U.S.S.R. approximates 10,000 annually--about twice the recruitment. Additional protection for both species is needed, particularly legislation controlling killing on the high seas. International cooperation, at least to the extent of free interchange of information, is urgently needed. --From abst. by J. L. Buckley.

van den Broek, Elisabeth, and P. Wensvoort. ON PARASITES OF SEALS FROM THE DUTCH COASTAL WATERS AND THEIR PATHOGENITY. Säugetierk. Mitt. 7(2): 58-62. May 1952. [From J. Mamm. 41(1), 1960.]

Williamson, Gordon R. (8 Woodside Ave., Walton on the Thames, Surrey, Eng.) THREE UNUSUAL RORQUAL WHALES FROM THE ANTARCTIC. Proc. Zool. Soc. London 133 (1): 135-144, 2 figs. + 2 pls. Oct. 1959.

Believed to be a new species of Balaenoptera. Comparisons with other "Balaena" whale are made.

MAMMALS--OTHER GROUPS

Ealey, E. H. M., and H. Suijdendorp. (C.S.I.R.O., Canberra, Australia.) PASTURE MANAGEMENT AND THE EURO PROBLEM IN THE NORTH-WEST OF WESTERN AUSTRALIA. J. Agr. W. Australia vol. 8 (Third series), no. 3: 273-286, 13 figs. May-June 1959.

The prime cause of the deterioration of these pastures has been a stocking policy that is unsuited to the climate and conditions, and not to the grazing of euros [kangaroos] that have bred up following increased water supplies. An abundance of euros, however, aggravates pasture degeneration caused by sheep and slow up the process of range regeneration. Reduction of euros is often necessary and water poisoning is the most promising method of control. Watering habits of the euros and water poisoning techniques using arsenicals are described. A combined pasture management and euro control program is outlined.

Gooding, D. (Agr. Prot. Board, Dept. Agr., Perth, W. Australia.) THE USE OF BOTULINUS TOXIN AS A POISON FOR KANGAROO (MARLOO) CONTROL IN WEST AUSTRALIA. J. Aust. Inst. Agr. Sci. 25(2): 141-143. 1959. [From Biol. Abst. 35(5).]

Use of botulinus toxin type C in drinking water is suggested as an effective, cheap and easily applied method of control of kangaroo. Protective vaccination of sheep against botulism is viewed as a favorable practice in any case.--M. S. Brown.

Hugghins, Ernest J., and George E. Potter. (Tex. A. & M. Coll., College Station.) MORPHOLOGY OF THE URINOGENITAL SYSTEM OF THE OPOSSUM. Bios 30(3): 148-154, 2 figs. Oct. 1959.

Lyne, A. G. (C.S.I.R.O., Prospect, N.S.W., Australia.) THE SYSTEMATIC AND ADAPTIVE SIGNIFICANCE OF THE VIBRISSAE IN THE MARSUPIALIA. Proc. Zool. Soc. London 133(1): 79-133, 26 figs. + 5 pls. Oct. 1959.

The distribution of vibrissae is described and illustrated in representatives (54) of all the families of marsupials. The vibrissae in each species have been examined, and a summary is given for each family.

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Connell, Clyde E., Eugene P. Odum, and Herbert Kale. (U. Ga., Athens.) FAT-FREE WEIGHTS OF BIRDS. Auk 77(1): 1-9, 2 figs. Jan. 1960.

From summ. Analysis of fat-free weights of 230 Savannah sparrows showed that sex, age and racial differences were entirely the result of differences in basic body size as indicated by wing length. A table of fat-free and lean dry weights of 14 spp. of migratory birds is included.

Davis, David E. (Pa. State U., University Park.) TERRITORIAL RANK IN STARLINGS. Anim. Behaviour 7(3-4): 214-221. July-Oct. 1959.

From summ. No territorial behavior of the conventional kind has been observed. The ♂♂ and ♀♀ drive other ♂♂ away from nest holes in the same manner that is used to establish rank in cages. From this evidence it is suggested that territory is really a special case of social rank.

Lindroth, Arne, and Eva Bergstöm. NOTES ON THE FEEDING TECHNIQUE OF THE GOOSANDER IN STREAMS. Inst. Freshwater Res. (Drottningholm) Rep. no. 40: 165-175, 9 figs. 1959.

Ducklings of the goosander, without mother bird, were observed in a stream tank. As assumed from earlier stomach content analyses, the birds practiced active search for fishes among pieces of gravel and stones without the optical stimulus of living or dead food fishes. Whether this is an innate behavior or learned could not be stated. The role of mergansers in depressing the salmon parr populations towards an absolute survival level is briefly discussed.--From authors' summ.

Macura, Antoni. (Jagellonian U., Krakow, Poland.) DELAYED REACTIONS IN THE TAWNY OWL (STRIX ALUCO ALUCO L.) Folia Biol. 7(4): 329-348, 13 figs. 1959.
In English with Polish and Russian summ. In delayed reaction studies, tawny owls show a considerably higher time of delay than other birds, cats, dogs, and raccoon, though lower than apes and children. More decisive periods of delay were noted in tawny owls whose task was to remember a more attractive incentive, namely food.

Myrberget, Svein. HVORDAN FINNER TREKKFUGLENE VEIEN? [HOW DO MIGRATING BIRDS FIND THEIR WAY?] Sterna [Stavanger Mus.] 3(5): 193-214, maps. 1959. [From Biol. Abst. 35(4).]
In Norwegian. A review article, discussing various theories on methods of direction-finding which birds might possibly use.

Strong, Reuben M. A BIBLIOGRAPHY OF BIRDS, WITH SPECIAL REFERENCE TO ANATOMY, BEHAVIOR, BIOCHEMISTRY, EMBRYOLOGY, PATHOLOGY, PHYSIOLOGY, GENETICS, ECOLOGY, AVICULTURE, ECONOMIC ORNITHOLOGY, POULTRY CULTURE, EVOLUTION AND RELATED SUBJECTS. PART 4. FINDING INDEX. Field Mus. Nat. Hist., Zool. Series 25(4): 1-186. 1959. [M. M. Nice in Bird-Banding 30(4), 1959.]
Serious students of ornithology will welcome the completion of Dr. Strong's monumental "Bibliography of Birds..." The Finding Index presents "one continuous alphabetically arranged list" with references to the Subject Index. Parts 1 and 2, the Author Catalogue, appeared in 1939 (see WR 27: 2), and part 3, the Subject Index, in 1946 (see WR 48:2).

Weller, Milton W. (Iowa State Coll., Ames.) PARASITIC EGG LAYING IN THE REDHEAD (AYTHYA AMERICANA) AND OTHER NORTH AMERICAN ANATIDAE. Ecol. Monog. 29 (4): 333-365, 14 figs. Oct. 1959.
Important, informative paper which includes a review of the literature and an account of the studies on parasitic egg laying in the redhead and other waterfowl in the Delta Marsh (Manitoba) and the Knudson Marsh (Utah). Deals with the behavior of the parasitizing female, parasitism and normal nesting of the redhead, factors affecting the degree of parasitism, reactions of the host and the effect of parasitism on the host and on the parasite. Clutch sizes of the redhead reported in the literature vary from 9-14 because of intraspecific parasitism. Unparasitized nests examined in the present study showed that the true clutch ranged from 5-9. Parasitism reduced the number of eggs laid by the host by 20% and decreased both egg and nest success. This was not measurable until 60-70% of the nests were parasitized and 4-6 eggs were added per nest. The canvasback which shares breeding range and habitat preference of the redhead suffers most from redhead parasitism. Bibliography of 204 papers.

Wolfson, Albert. (Northwestern U., Evanston, Ill.) ROLE OF LIGHT IN THE PROGRESSIVE PHASE OF THE PHOTOPERIOD RESPONSES OF MIGRATORY BIRDS. Biol. Bul. 117(3): 601-610, 6 figs. Dec. 1959.
From summ. "To determine the roles of light and darkness in the photoperiodic responses of birds, effective photoperiods were combined with normal inhibitory dark periods to give cycles longer than 24 hours." [Five combinations.] "The experiments were performed in winter and spring, and tested both induction and maintenance of the gonadal and fat responses. The photoperiod and not the dark period determined the response. Long dark periods per se, therefore, are not inhibitory." It is indicated "that the gonadotrophic and lipogenetic effects of each stimulatory light-dark cycle are 'stored', or cannot be negated by long intervening dark periods. The relation of these findings to the theories of the mechanism of response to light and dark is discussed." The species used was the slate-colored junco.

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Van Tyne, Josselyn, and William H. Drury, Jr. (Drury: Drumlin Farm, South Lincoln, Mass.) THE BIRDS OF SOUTHERN BYLOT ISLAND, 1954. Occas. Pap. Mus. Zool., U. Mich. no. 615. 1-37 p., 2 figs., 3 pls. Dec. 1959.

Includes faunal lists of birds (with their Eskimo names) found on this island. Bylot Island, located north of Baffin Island, is near the dividing line between the arctic bird faunas related to the Old and New Worlds.

BIRDS--POPULATIONS & FLUCTUATIONS

Aumann, Glen, and John T. Emlen, Jr. (U. Wis., Madison.) THE DISTRIBUTION OF CLIFF SWALLOW NESTING COLONIES IN WISCONSIN. Passenger Pigeon 21(3): 95-100, 1 fig. Autumn 1959.

A total of 405 colonies containing 11,534 nests was reported. Based upon rural mail carriers' questionnaires and field work by ornithologists. Climatic factors are of little importance in restricting distribution. Swallow distribution correlated with soil type--gray soils over red clay supported high populations, while gray brown, sandy or prairie types had low populations. Three essential environmental features for colonization are (1) a cliff or cliff substitute with overhang providing nest sites, (2) a fairly open landscape with meadows, marshes or open water for foraging, and (3) a local source of mud of a suitable texture for nest building. Only 11% of the colonies were found on natural cliffs; 63% of the colonies were found on barns.

Ferry, C., and B. Frochot. UNE METHODE POUR DENOMBRER LES OISEAUX NICHEURS. [A METHOD FOR CENSUSING NESTING BIRDS.] La Terre et la Vie (Paris) 105(2): 85-102, illus. 1958.

In French. Study made in Etaules (Cote d'Or) 12 km. nw. of Dijon, France, in different aged stands of forest, principally Querceto carpinetum, cut on a 45 year cycle. Census method involved walking, at 1-2 km./hr., a definite line 500-1000 meters long through homogeneous vegetation, stopping every 20 meters to record all birds seen or heard in a 200 meter wide area on one side of line. For analyses the two best censuses were used, one before April 25, the other after. Data were expressed as a density index, nesting pairs/km. (indice kilometrique d'abondance, or I.K.A.). After cutting of mature growth, nesting species increased from 1 to 17 in the first 10 years, declined to 14-15 by 20-25 years, and then increased to 20 species by the 40th year. Density of certain species as robin (Erithacus rubecula) increased slowly to a maximum density index by 40 years; other species increased more or less rapidly in early aged stands, to decline to zero as the forest developed: tree pipit (Anthus trivialis) to zero in 18 years, yellowhammer (Emberizia citrinella) in 29 years, chiffchaff (Phylloscopus collybita) in 38 years.--From abst. by R. M. Chew.

Haftorn, Svein. POPULATION CHANGES, ESPECIALLY GEOGRAPHICAL CHANGES, IN THE NORWEGIAN AVIFAUNA DURING THE LAST 100 YEARS. Sterna 3(3): 105-137. 1958. [From review by O. L. Austin, Jr., in Bird-Banding 30(4), Oct. 1959.]

In Norwegian with English summ. An interesting and highly significant analysis of the changes in numbers and distribution of the Norwegian avifauna during the past century. Man is shown to be directly responsible for most of the shrinking ranges and diminution in numbers of many species...either directly through hunting and unconscious destruction of nests...or indirectly through ruining breeding places.

Jebe, E. H. (Iowa State U., Ames.) 142 QUERY: ON A QUAIL ROADSIDE COUNT TECHNIQUE. Biometrics 15(4): 628-631. Dec. 1959.

Concerned with determination of sample size for Gambel quail routes. Involves a four way analysis of variance of log transformed data. Question involves use of transformed or untransformed data in determining sample size. This is a common question of biologists.--V. Schultz.

BIRDS--POPULATIONS & FLUCTUATIONS--Continued

Selander, Robert K. (U. Texas, Austin.) SEX RATIO OF NESTLINGS AND CLUTCH SIZE IN THE BOAT-TAILED GRACKLE. Condor 62(1): 34-44, 1 fig. Jan.-Feb. 1960.
From summ. Sex ratio of nestling grackles was determined by dissection of 83 nestlings from a large Texas colony. Neither the primary nor the nestling ratio showed significant deviation from an expected 50:50 ratio. Previous reports of a sex ratio strongly unbalanced in favor of ?? among nestlings in La. is attributed to an unreliable method of sex determination. Evidence of unbalanced tertiary sex ratios in icterids is reviewed and several sources of error in their determination are pointed out. In Texas, an estimated 6.7 percent of eggs laid are infertile--this contrasts with reports of high frequency of infertile eggs in nests for other studies.

Stine, Perna M. (1304 Tenth Ave., Zephyrhills, Fla.) CHANGES IN THE BREEDING BIRDS OF BIRD HAVEN SANCTUARY OVER A PERIOD OF FORTY-FIVE YEARS. Wilson Bul. 71(4): 372-380, 1 fig. Dec. 1959.
A 10-year study of bird life at Bird Haven (Richland Co., Ill.) was completed in 1955. A comparison is made with the list of birds found breeding there by Ridgeway in the period 1907-10.

BIRDS--ECONOMICS, CONTROL, MORTALITY

Chappellier, A., J. Giban, and M. Cuisin. LES CORBEAUX DE FRANCE ET LA LUTTE CONTRE LES CORBEAUX NUISIBLES. [THE CROWS OF FRANCE AND THE CONTROL OF NUISANCE CROWS.] Soc. Zool. Agr. (40 rue Lamartine, Talence, France). 107 p., 25 figs. 1959.
In French. Part I contains descriptions of the 7 spp. of crows found in France annotated as to their distribution, habitats, nesting, mortality, nutrition, movements and economic importance. Part II deals with various aspects of control: general; natural enemies; control by destruction of (1) young, (2) adults; crop protection by means of scarecrows, detonators, repellents and acoustic devices. Part III is on legislation and regulations for the control of crows.

Crebbs, Thomas C., Jr. BLACKBIRDS AND AGRICULTURE IN SOUTHEASTERN VIRGINIA. Va. Coop. Wildl. Res. Unit Release no. 59-10. 3 p. (mimeo.) 1959.
A report on blackbird depredations on peanuts, corn, and grain sorghum crops in se. Va. Weather conditions reduced damage to peanuts during 1958-9; damage seems to have varied in direct proportion to Nov.-Dec. weather conditions during past years. [Paper presented at Va. Acad. Sci. Meeting, Charlottesville, May 8, 1959.]--Burd S. McGinnes.

Giltz, M. L., and T. M. Stockdale. THE RED-WINGED BLACKBIRD STORY. Ohio Agr. Exp. Sta., Spec. Cir. 95. 18 p., illus. Mar. 1960.
A narrative progress report on investigations of redwinged blackbird depredations to corn in Ohio. Includes information on the biology of and the amount of crop damage caused by the redwing. Describes several methods of protecting crops, emphasizing cultural practices and habitat manipulations, especially that of mowing hay fields when a majority of the blackbird nests contain young.--R. T. Mitchell.

Howard, Walter E. (U. Calif., Davis.) THE EUROPEAN STARLING IN CALIFORNIA. Calif. Dept. Agr. Bul. 48(3): 171-179, illus. July-Sept. 1959.
The identification, life history, habitat requirements, economic status, potential hazard to California, and control methods of the starling are treated. More than 200 references were examined of which 59 are cited.

Mörzer Bruijns, M. F. (R.I.V.O.N., Bilthoven, Netherlands.) STOOKOLIEVOGELS OP DE NEDERLANDSE KUST. [OILED BIRDS OF THE NETHERLANDS COAST.] De Levende Natuur 62: 172-178, 1 fig. 1959.
In Dutch. Contains a summary table of recoveries by months of 50 spp. of oiled birds for the period 1947-58. All were found within 400 km. of the Netherlands coastline. The annual toll is estimated at from 20,000-50,000 birds.

Owen, D. F. (Mus. Zool., U. Mich., Ann Arbor.) MORTALITY OF THE GREAT BLUE HERON AS SHOWN BY BANDING RECOVERIES. Auk 76(4): 464-470. Oct. 1959.
Based on recoveries of birds banded as nestlings. The mortality of the great blue heron in the first yr. of its life was 71%. The average annual rate, thereafter, was 29%. These figures parallel those calculated for the gray heron in Britain. During the 1st yr. of life there is a high death-rate for Aug.-Dec., then a steady decrease. Possible sources of error in calculating this mortality rate are discussed.

Wallace, George J. (Mich. State U., E. Lansing.) ANOTHER YEAR OF ROBIN LOSSES ON A UNIVERSITY CAMPUS. Aud. Mag. 62(2): 66-69, 3 photos. Apr. 1960.
A follow-up of "Insecticides and Birds" [see WR 95: 19] which dealt with the effects on birds of early spring spraying of DDT for elm bark beetle control. During April-June of 1959, the maximum count of robins made during 30 censuses on the n. campus was 22 birds ranging from 4 to 15 in May-June. During the period 50 records of mortalities had accumulated. The total loss of robins in a situation like this may be several times greater than the entire population present at any one time. In essence this means the more or less complete elimination of the original breeding population, plus one or more replacement populations. For other species there is less data, however a "dearth of summer resident insectivorous birds and a compensating (?) abundance of the omnivorous or scavenger types. In summary, on [North Campus]...we had none, or at most, 1 or 2 pairs/100 acres of what are ordinarily our commonest insectivorous birds."

BIRDS--PARASITES AND DISEASES

Bałańska, K. TAPEWORMS OF BIRDS / EXCLUSIVE ANATIDAE / OF LAKE GOŁDAPIWO. Wiadomości Parazytologiczne (Warsaw) 2(5): 209-210. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]
In Polish. Phenomenon of the inhibition of growth or growth and development of larvae together with the increase of the number of population.

Clark, Gordon Marston. (Patuxent Wildl. Res. Cent., Laurel, Md.) CASE REPORT--ASPERGILLOSIS IN NATURALLY INFECTED COWBIRDS AND GRACKLES. Avian Dis. 4(1): 94-96. Feb. 1960.
During the 1958 nesting season, Aspergillus fumigatus was isolated from 3 fledgling grackles of 33 nestlings and fledglings autopsied. More than 250 blackbirds were examined from a winter roost in 1958-9. Of these, 2 cowbirds and 2 grackles had aspergillosis. Indications are that aspergillosis is a reasonably common pathogen in adult blackbird populations and that on occasion it might be a serious disease of fledgling grackles.

Keymer, I. F. A SURVEY AND REVIEW OF THE CAUSES OF MORTALITY IN BRITISH BIRDS AND THE SIGNIFICANCE OF WILD BIRDS AS DISSEMINATORS OF DISEASE. PART II. Vet. Rec. 70: 736-740. (1958.) [From Vet. Bul. 29, p. 460, item 2614, 1959.]
Literature review as title.--David O'Meara.

Lainson, R. SOME OBSERVATIONS ON THE LIFE CYCLE OF ATOXOPLASMA, WITH PARTICULAR REFERENCE TO THE PARASITES SCHIZOGANY AND ITS TRANSMISSION BY THE MITE, DERMANYSSUS GALLINAE. Nature (London) 182: 1250-1251. 1958.--David O'Meara.

Mondini, S., and G. L. Quaglio. LA STAPILOCOCCOSI DEI VOLATILI IN GENERE E DEI POLLI IN PASTICOLARE. [STAPHYLOCOCCUS INFECTION OF FOWLS.] Zooprofilassi 14: 79-122. 1959. [From Vet. Bul. item 3021, Oct. 1959.]
English summ. Review of staphylococcus infections occurring in domestic and wild birds for the last 80 years.--David O'Meara.

Moore, R. W., J. R. Watkins, and J. R. Dixon. EXPERIMENTAL ORNITHOSIS IN HERONS AND EGRETS. Am. J. Vet. Res. 20(79): 884. Oct. 1959.
The birds infected apparently remained without signs of the infection but developed a serologic titer. Virus was recovered by cloacal swabs for as long as 67 days.--David O'Meara.

Peckham, M. C. (N. Y. State Vet. Coll., Ithaca.) AN ANAEROBE, THE CAUSE OF ULCERATIVE ENTERITIS, "QUAIL DISEASE." Avian Dis. 3(4): 471-478, 4 figs. Nov. 1959.
"Quail disease" has been reported for western quail, ruffed grouse, wild and domestic turkeys, chukar partridge, pigeons and chickens. This report describes the isolation of a Gram positive, anaerobic, spore-forming bacillus from the liver and blood of quail with intestinal and liver lesions of ulcerative enteritis.

Winn, J. F., and E. E. Bennington. AN ATTEMPT TO RECOVER WESTERN EQUINE ENCEPHALITIS FROM THE NASAL MITES OF SPARROWS. Proc. Soc. Exp. Biol. & Med. 10: 135-136. 1959.
Thirty-six of 44 sparrows had neutralizing antibodies to western equine encephalitis after 20 days.--David O'Meara.

GAME BIRDS--GENERAL

Everin, W. J. A BASIS FOR UPLAND GAME BIRD MANAGEMENT. Mont. Wildl. 1-32 p., illus. Nov. 1959.
The entire issue is devoted to upland gamebirds. Information on range, description, life history, general notes and a distribution map is given for blue grouse, ruffed grouse, Franklin's grouse, sage grouse, sharptailed grouse, ringneck pheasant, Hungarian partridge, Merriam's wild turkey, and chukar partridge.

QUAIL

Baskett, Thomas S., and Roy E. Tomlinson. (Mo. Coop. Wildl. Res. Unit, U. Mo., Columbia.) BOBWHITES AND BENEFIT PAYMENTS. Trans. 24th N. Am. Wildl. Conf. p. 289-303, 4 figs. 1959.
According to an earlier study, yearly increases in quail followed a 5-yr. program of farm improvement on the study area in Mo. This program, terminated in 1949, was speeded by double benefit payments. Our study in 1957-8 showed that liming, fertilizing, and other practices had been continued and were often supported by ASC benefit payments. However, with no guidance by game managers, few practices were now beneficial to wildlife. With more intensive farming, fall quail populations dropped from 751 in 1950 to 305 in 1958. Between 1950 and 1957-8, a check area had undergone drastic reductions in game cover and food. Entire wooded hollows had been bulldozed and several farms were now managed intensively for livestock. Liming, fertilizing, etc., were regular practices, often with the aid of benefit payments. On 960 acres, fall quail populations dropped from 174 in 1950 to 65 in 1958. The history of the 2 areas since 1950 clearly illustrates that without consideration for wildlife, benefit payments and practices they encourage may be of little value for wildlife. On one area, these practices only partially counteracted harmful effects on game of more intensive farming. On the other area, they went hand in hand with virtually complete destruction of game habitat.--T. S. Baskett.

Campbell, Howard. (Dept. Game & Fish, Albuquerque, N. Mex.) EXPERIMENTAL FEEDING OF WILD QUAIL IN NEW MEXICO. Southwestern Nat. 4(4): 169-175. Dec. 15, 1959.
From abst. The response of wild populations of scaled and Gambel's quail to artificial feeding of grain was studied for the 3-year period 1954-6. Resultant quail increases, if any, were much too small to justify the high cost of feeding.

Campbell, Howard. (Dept. Game & Fish, Albuquerque, N. Mex.) AN EVALUATION OF GALLINACEOUS GUZZLERS FOR QUAIL IN NEW MEXICO. J. Wildl. Mgt. 24(1): 21-26. Jan. 1960.
In the period 1950-5, 181 rainwater catchments (guzzlers) were built in N. Mex. for scaled and Gambel's quail. The results were evaluated mainly for 1954-6 period. It was confirmed that guzzlers are efficient in providing permanent water under very arid conditions. It was concluded that they are

biologically ineffective and economically unsound in N. Mex. quail management under the local climatic pattern of summer rains and winter drought--the reverse of the rainfall pattern in regions where guzzlers have been reported successful as quail management tools.--Auth. abst.

Du Bose, R. T., and L. C. Grumbles. (Dept. Vet. Microbiol., Texas Agr. Exp. Sta., College Station.) THE RELATIONSHIP BETWEEN QUAIL BRONCHITIS VIRUS AND CHICKEN EMBRYO LETHAL ORPHAN VIRUS. Avian Diseases 3(3): 321-344. Aug. 1959.

Quail bronchitis virus and chicken embryo lethal orphan virus could not be differentiated by a series of diagnostic tests and they are considered to be the same agent.

Kirkpatrick, Ralph D. (Rt. 2, Fairmont, Ind.) COTURNIX INVESTIGATION / FINAL REPORT. Ind. Dept. Cons., Div. Fish & Game. iii + 27 p., mimeo. Sept. 1959.

Includes a history of coturnix introductions in the U. S. and Indiana and information on hatchery production, release studies, put and take releases and recommendations. Coturnix have not become established in Indiana despite stockings of about 20,000 birds in a two-year study period. Total recoveries from put and take releases on public hunting areas ranged from 34.9% - 60.5% for coturnix compared with 36.3% - 64.9% for bobwhites. Hunters preferred to hunt put and take bobwhite rather than coturnix. Coturnix propagation by game department or by sportsmen is not recommended for economic reasons.

Schemnitz, Sanford D. (Okla. Coop. Wildl. Res. Unit, Stillwater.) PAST AND PRESENT DISTRIBUTION OF SCALED QUAIL (CALLIPEPLA SQUAMATA) IN OKLAHOMA. Southwestern Nat. 4(3): 148-152, 1 fig. Oct. 1959.

A mail, personal interview and direct observation survey of scaled quail indicated that for 16 w. Okla. counties (exclusive of Cimarron County), there was a population of 980 scaled quail during 1954-7. A total of 47.1% of those tallied was from the sand sagebrush vegetation type. It is recommended that future releases of scaled quail should be restricted to the vegetation type.

Williams, G. R. (N. Z. Wildl. Serv., P. O. Box 8007, Wellington, N. Z.) AGING, GROWTH-RATE AND BREEDING SEASON PHENOLOGY OF WILD POPULATIONS OF CALIFORNIA QUAIL IN NEW ZEALAND. Bird-Banding 30(4): 203-218, 6 figs. Oct. 1959.

A 3-yr. N. Z. study of the moult of captive Calif. quail resulted in a technique which is accurate for the aging of wild quail between 4 and 21 weeks. An index of population size, apparent sex differences in juvenile mortality and the phenology of the breeding season were derived using this technique. A mathematical appendix by A. H. Carr explains a method of correcting hatching-date histograms.

PHEASANTS

Klonglan, Eugene D., Russell L. Robbins, and Bromfield L. Ridley. (Iowa Coop. Wildl. Res. Unit, Ames.) EVALUATION OF EFFECTIVENESS OF PHEASANT FLUSHING BARS IN IOWA HAYFIELDS. Proc. Iowa Acad. Sci. 66: 534-552, 3 figs. Dec. 1959.

From abst. A 3-year study on 394 acres of hayfields revealed an overall reduction in hen mortality of 38% through the use of flushing bars. (Significant at the 0.01 probability level.) For individual years, only 1954 showed a significant reduction in hen mortality, the observed 54% decrease being significant at the 0.05 probability level. The bars were most effective in flushing hens that were in the hay, but not sitting on the nest. Flushing bars were more effective in the afternoon than the forenoon hours. As the density and height of the hay increased, the effectiveness of the bar decreased rapidly. No noticeable increase in fall populations attributable to the use of flushing bar--the principle of "carrying capacity" may act to cancel any initial gain resulting from the use of flushing bars.

Lyon, L. Jack. (Colo. Game & Fish Dept., Denver.) AN EVALUATION OF WOODY COVER PLANTINGS AS PHEASANT WINTER COVER. Trans. 24th N. Am. Wildl. Conf. p. 277-289. 1959.

In general, it appeared that pheasant use could never be expected in plantings not bordered by wheat stubble or weedy areas. In addition, those plantings in which deep snowdrifts had collected were avoided by birds. The combined influences of temperature, precipitation and wind were almost entirely responsible for periodic fluctuations in pheasant use of deciduous plantings during the midwinter period. The response of pheasants to winter conditions showed that deciduous woody windbreaks, considered simply as winter cover, probably have no justification in pheasant management.--From summ.

GROUSE, PARTRIDGE, ETC.

Bezubik, B. (Agr. Coll. Lublin, Poland.) HELMINTHOFAUNA OF PARTRIDGE (PERDIX PERDIX) IN THE LUBLIN PALATINATE. Acta Parasit. Polonica 7(9): 179-188. 1959. [From Biol. Abst. 34(5).]

In English with Polish summ. One hundred thirty-six out of 270 partridge were found to have nematode infections (50%). The severity of infections was relatively low--several to less than 100 worms occurring per bird; however, the intensity of tape worm infection was very high, sometimes up to several thousand parasites per bird. Inflammation of the mucous membrane of the alimentary tract was found occasionally due to Hymenolepis cantaniana. The parasites found in partridge were those common to domestic fowl. Three such are new to this host: Hymenolepis cantaniana, Capillaria bursata and Syngamus trachea.--From abst. by MDS.

Dorney, Robert Starbird. RELATION OF HUNTING, WEATHER AND PARASITIC DISEASE TO WISCONSIN RUFFED GROUSE POPULATIONS. Ph.D. thesis, U. Wis. 114 p. 1959. [From long abst. in Dissertation Abst. 20(3), 1959.]

For the period 1949-58, ruffed grouse population densities in n. Wis. were high for 1949-52 and 1957, and low in 1954. Av. sex and age ratios for juveniles were 50 ♂♂ : 50 ♀♀ and for adults 54 ♂♂ : 46 ♀♀; 80% of the total population were juveniles. Hunting harvest tended to be density related in 2 study areas with 7-34% being harvested. Parasitic disease was also density related since late-winter population levels were found to be directly related to infection of Ascaridia bonasae in young grouse the following summer. A warm May was characterized by above-average production and even fall adult sex ratios; a cold May, by low production and a loss in adult ♀♀; high populations were more sensitive to May temperatures than low populations. Population decline was caused by increased winter and summer brood mortality rather than by hunting losses.

Fisher, Harvey I., and Robert S. Ellarson. (S. Ill. U., Carbondale.) AN ABNORMAL STERNAL APPARATUS IN A RUFFED GROUSE, BONASA UMBELLUS. Trans. Ill. State Acad. Sci. 51(3-4): 34-36, 2 figs. 1958 (1959).

The significant points of this paper as listed by the authors are as follows: "1) The deviations are apparently not the result of injury; 2) the malformations are restricted to flat bones; and 3) there has been a satisfactory readjustment of muscular attachments and masses to compensate for the severe malformations of bones and to permit normal flight."--Kenneth L. Williams.

Jacobs, Karl F. (Okla. Dept. Wildl. Cons., Chickasha.) RESTORATION OF THE GREATER PRAIRIE CHICKEN. Okla. Dept. Wildl. Cons. vi + 42 p., illus. 1959.

From abst. During 1956-9, in ne. Okla., 370 greater prairie chickens were trapped and 314 of the birds were released on 4 restoration areas. Substantial re-establishment has been observed on 2 of these areas, fair re-establishment on the third, but on the fourth the results were negative. It is concluded that greater prairie chicken re-establishment is possible through trapping and transplanting in certain grasslands from which it has been extirpated. Further restoration will be slow on these extensive areas unless a more successful trapping technique can be developed.

Koskimies, J. SEASONAL, GEOGRAPHICAL AND YEARLY TRENDS IN THE WEIGHT OF CAPERCAILLIE (TETRAO UROGALLUS) AND BLACKGAME (LYRURUS TETRIX) IN FINLAND. Ornis Fennica 35: 1-18. 1958.

An analysis of 3,659 capercaillie and 4,498 blackgame shows that in autumn juveniles are lighter than adults and ♀♀ lighter than ♂♂. All increase in weight from Sept. to Nov. (maximum weight). Mean annual winter weight is higher when mean temperature is low. Blackgame are heaviest in the north and capercaillie in the south.--RJA in Ibis 101(3-4), July-Oct. 1959.

Mussehl, Thomas W. (Mont. Fish & Game Dept., Lewistown.) BLUE GROUSE PRODUCTION, MOVEMENTS, AND POPULATIONS IN THE BRIDGER MOUNTAINS, MONTANA. J. Wildl. Mgt. 24(1): 60-68, 2 figs. Jan. 1960.

Information was obtained on the chronology and extent of seasonal movements, development of young, population characteristics and general life history of blue grouse Dendragapus obscurus. During 1957 and 1958, 236 grouse were banded on the summer brood range. Observations of marked grouse indicated movements were mostly within a 0.5 mile area on the summer brood range. Dispersal from summer range and upward migration were under way by late Aug. During hunting seasons in late Sept. less than 10% of the banded grouse were harvested. Early Sept. seasons should improve hunter success as more blue grouse would still be present in accessible areas of their mountain habitat.--From auth. abst.

Ryder, Ronald A. (Colo. State U., Ft. Collins.) THE GROUSE OF COLORADO. Colo. Outdoors 9(1): 1-7, illus. Jan.-Feb. 1960.

White-tailed ptarmigan, lesser and greater prairie chickens, sharp-tailed, blue and sage grouse occur in Colo., possibly ruffed grouse. Franklin's spruce grouse was formerly reported for the state but this report is doubtful. Distribution, preferred habitats, food, reproductive behavior and general descriptions are discussed. In recent years only ptarmigan, blue, sharp-tailed and sage grouse have been legally hunted. Blue grouse have been most important in the bag although sage grouse are almost equal in importance. Management problems such as census, cycles, loss of habitat and possible re-introduction of lesser prairie chickens in some areas are mentioned.--Author.

Steinhoff, Harold W. THE DUSKY GROUSE AND ITS ECOLOGY IN COLORADO. Ph.D. thesis, Syracuse U. 173 p., 28 figs. 1956.

Ecologic factors of climate, topography, geology, food and water, vegetation, and man were studied with relation to dusky grouse abundance on 101 townships in Colo. and 112 sections in Larimer County, Colo. A statistical model was developed which would be useful for similar ecologic studies. Coefficients of association were computed and rating scales were devised for dusky grouse range. Dusky grouse range in Colo. is primarily coniferous forest, with aspen, but with very little grass, shrubs, or piñon-juniper woodland. It occurs at average elevations over 7,500 feet. Areas with soils of granitic or igneous origin are preferred by dusky grouse to those derived from shale or sandstone.--From abst.

Warner, Dwain W. (Minn. Mus. Nat. Hist., Minneapolis 14.) THE SONG, NEST, EGGS, AND YOUNG OF THE LONG-TAILED PARTRIDGE. Wilson Bul. 71(4): 307-312, 2 figs. Dec. 1959.

Based upon observations of Dendrortyx macoura made in Mexico in 1953-4.

TURKEY

Anthony, D. W., and D. J. Richey. INFLUENCE OF BLACK FLY CONTROL ON THE INCIDENCE OF LEUCOCYTOZOON DISEASE IN SOUTH CAROLINA TURKEYS. J. Econ. Ent. 51: 845-847. 1958.

Plots (1 x 4 miles) each having a turkey farm were treated with 5% DDT. Good control of larvae and pupae for 4 weeks was accomplished. Other vectors are indicated.--David O'Meara.

James, Douglas, and John R. Preston. (U. Ark., Fayetteville.) AN INVENTORY IN 1957 OF THE DISTRIBUTION OF THE WILD TURKEY (MELEAGRIS GALLOPAVO SILVESTRIS VIEILLOT) IN THE OZARK PLATEAU REGION OF ARKANSAS. Proc. Ark. Acad. Sci. 13: 83-90, 2 figs. 1959.

This resurvey of turkeys revealed changes in status since the survey of the period 1942-6. More decreases than increases were noted, but turkeys now occur in the Ozark National Forest where previously they were extinct or nearly so.

Kennamer, Earl Franklin. (API Ext. Serv., Auburn, Ala.) LONGEVITY AND RANGE OF A CRIPPLED TURKEY TOM. J. Wildl. Mgt. 23(4): 460. Oct. 1959.

Observed range of a crippled wild turkey tom during four spring hunting seasons was limited to 234 acres.--Auth. abst.

Latham, Roger. (Pittsburgh Press, Pittsburgh, Pa.) SOME CONSIDERATIONS CONCERNING THE EMERGENCY WINTER FEEDING OF WILD TURKEYS IN NORTHERN STATES. Trans. 24th N. Am. Wildl. Conf. p. 414-421. 1959.

Review paper. "In conclusion, it would appear, from evidence presented, that Pennsylvania could revise its wild turkey winter feeding program with a considerable savings of money and effort without endangering the future of this grand bird."

Spicer, Robert L. (N. Mex. Dept. Game.) WILD TURKEY IN NEW MEXICO / AN EVALUATION OF HABITAT DEVELOPMENT. N. Mex. Dept. Game & Fish, Bul. no. 10. 64 p., illus. 1959.

A study of the effects of habitat development on Merriam's wild turkey. Most important among these developments are water development, grain patches, platform feeders, fences to exclude domestic livestock, access roads, planted grasses and shrub plantings. Adult turkeys drank water frequently, perhaps daily, during the warmer seasons, and left the territory when water became unavailable. Apparently, young poults did not require water as frequently as adults. It is unnecessary to develop water for turkey use at intervals less than 2 miles. Deer were serious competitors with turkeys for the planted grains and field peas. There was no important competition for the developed water or the grain on platform feeders. The effects of hunting, development of water, platform feeders, deferred grazing, grain patches and snow conditions on predation of turkeys were discussed.

DOVES AND PIGEONS

Fichter, Edson. (Idaho State Coll., Pocatello.) MOURNING DOVE PRODUCTION IN FOUR IDAHO ORCHARDS AND SOME POSSIBLE IMPLICATIONS. J. Wildl. Mgt. 23(4): 438-447. Oct. 1959.

The mourning dove nests in a variety of habitats in se. Idaho where the breeding season allows 3 nesting cycles. In 4 orchards totaling 13.4 acres, approximately 100 pairs attempted 266 nestings in 208 nests in 1953; 67% of the nestings were successful. Of 510 eggs laid, 385 hatched; 324 fledglings comprised 64% of attempted production. Causes of mortality were obscure. Nesting success shows some correlation with numbers fledged per nesting attempt and per 100 eggs laid. Improvement of breeding habitat may permit an increase in nesting density, but the immediate environs of such habitat may influence its use by mourning doves. Since losses of eggs exceed those of nestlings by about 2:1, any attempt to improve breeding habitat might benefit by an evaluation of security factors as they respectively relate to the incubation and brooding phases of the nesting process.--From auth. abst.

Johnston, Richard F. (Mus. Nat. Hist., Lawrence, Kansas.) BEHAVIOR OF THE INCA DOVE. Condor 62(1-2): 7-24, 2 figs. Jan.-Feb. 1960.

Important life history paper on a small, ground-foraging dove that occurs from sw. United States through Mexico to n. Costa Rica based on observations made during 1956-8 in N. Mex., Texas, and Mexico.

Schultz, Vincent, and Frank A. Winston. (Atomic Energy Comm., Wash. 25, D. C.) A NOTE ON JUVENILE MOURNING DOVE POPULATIONS AT WEST PALM BEACH, FLORIDA. J. Wildl. Mgt. 24(1): 105-106. Jan. 1960.

Paper is concerned with the trend in the percent of newly banded birds that were juveniles during Mar.-Feb., as well as a comparison of individual period trends through the 8 years of banding. The primary purpose of this paper is to determine whether or not the eight yearly trends of percent juveniles in the unbanded adult-juvenile sample could adequately be described by one curvilinear regression line. It was concluded that they could not.--Authors' abst.

WATERFOWL

Atwood, Earl L. HUNTER KILL OF MIGRATORY WATERFOWL IN THE PACIFIC FLYWAY DURING THE 1958-59 HUNTING SEASON. US F&WS Suppl. to Spec. Sci. Rep.--Wildl. no. 45. 1 + 5 p. Jan. 1960.

"The purpose of this report is to complete the 1959 Status Report of Waterfowl."

Balham, R. W., and K. H. Miers. (N. Z. Wildl. Div., Wellington.) MORTALITY AND SURVIVAL OF GREY AND MALLARD DUCKS BANDED IN NEW ZEALAND. N. Z. Dept. Internal Affairs, Wildl. Publ. no. 5. 1-56 p., 14 figs. 1959.

From summ. Grey duck appear at a biological disadvantage compared with the mallard: they have a lesser breeding potential, av. clutch 8-9 eggs compared with 10-12; they are required to rear to the "flapper" stage 4.4 young per pair to replace population losses compared with 2.9; they have a higher mortality rate than the mallard; they decoy more readily and so are more easily shot; and they are more exacting in their habitat requirements and have suffered to a much greater extent than the mallard in the conversion of wet lands to farm lands. Grey duck tend to disperse in all directions and may cover the length and breadth of N. Z., while mallards are of a comparatively sedentary habit and seldom move far from the place where they were bred.

Clark, Gordon M., and Vernon D. Stotts. (Patuxent Wildl. Res. Cent., Laurel, Md.) SKIN LESIONS ON BLACK DUCKS AND MALLARDS CAUSED BY A CHIGGER (WOMERSIA STRANDTMANI WHARTON, 1947). J. Wildl. Mgt. 24(1): 106-108, 1 fig. Jan. 1960.

The occurrence of extensive skin lesions on black ducks and mallards in the Kent Island area of the Chesapeake Bay is reported. This was caused by the apoloniid chigger, Womersia strandtmani, which had previously been found only on a brown pelican in Galveston, Tex. The pathology of this condition is described and figured.--G. M. Clark.

Collias, Nicholas E., and Laurence R. Jahn. (U. Calif., Los Angeles.) SOCIAL BEHAVIOR AND BREEDING SUCCESS IN CANADA GEESE (BRANTA CANADENSIS) CONFINED UNDER SEMI-NATURAL CONDITIONS. Auk 76(4): 478-509, 6 figs. Oct. 1959.

From summ. The breeding behavior, vocalizations and dominance order of Canada geese confined under semi-natural conditions at Horicon Marsh, Wis., are described in some detail, with special reference to social interactions between individually marked birds. In the 1952 breeding season, about 70% of the theoretical or potential increase was lost. This loss was traced to (1) failure of birds to pair effectively, (2) failure to lay and incubate eggs, and (3) to loss of clutch once laid, all generally as a result of domination by other birds.

Cottam, Clarence, and W. C. Glazener. (Welder Wildl. Found., Sinton, Texas.) LATE NESTING OF WATER BIRDS IN SOUTH TEXAS. Trans. 24th N. Am. Wildl. Conf. p. 382-395. 1959.

From summ. In the late summers of 1957 and 1958, a total of 513 nests of tree ducks, coots, Florida and purple gallinules, pied-billed and Mexican grebes, least bittern and green heron were found on the lakes of 7,800 acre Welder Wildl. Ref. Information is given on ecology, nest history, nesting abundance and success, and parasitism of these birds.

Crissey, W. F., compiler. 1958 STATUS REPORT OF WATERFOWL. US F&WS, Spec. Sci. Rep.--Wildl. no. 40. ii + 133 p., 4 maps. Aug. 1958.
This report is a summary of the results of the winter survey, the breeding ground survey, and the kill data and "presents a forecast of anticipated change in the relative size of the 1958 fall flight of ducks, geese, brant, and coot in each of the waterfowl flyways in the United States." Indications of fall duck flights: Pacific flyway -- small increase; Central flyway -- no change; Mississippi flyway -- puddlers -- no change, divers -- apparent increase; Atlantic flyway -- moderate decrease (as compared with 1957 flights).

Crissey, W. F., compiler. 1959 STATUS REPORT OF WATERFOWL. US F&WS, Spec. Sci. Rep.--Wildl. no. 45. ii + 169 p., 4 maps. Aug. 1959.
Using techniques of previous years (see above) the following predictions as to Fall 1959 flights of ducks are made: Pacific flyway -- moderate decrease; Central flyway -- marked reduction; Mississippi flyway -- marked reduction; Atlantic flyway -- moderate decrease. Breeding conditions for canvasbacks and redheads were particularly adverse in 1959 and a drastic reduction in the populations of these 2 spp. is anticipated.

Delacour, Jean. THE WATERFOWL OF THE WORLD. VOL. III. Country Life Ltd., 2-10 Tavistock St., London W.C.2, Eng. 1-270 p., 20 pls., 46 maps. 1959. Price - six guineas.
Third volume of a desirable but costly set. Vol. I covered geese, shelducks and other more terrestrial members of Anatidae. Vol. II covered the dabbling ducks and 5 "aberrant monospecific genera." The 5 remaining tribes are surveyed in Vol. III: the eiders (Somateriini); the pochards (Aythyini); the perching ducks (Cairinini); the scoters, goldeneyes and mergansers (Mergini); and the stiff-tailed ducks (Oxyurini). The pattern of the previous volumes is followed: for each species, the principal characteristics of adult, immature, young and egg are summarized; geographical distribution is described and mapped followed by descriptions of general habits in the wild and in captivity. The excellent plates by Peter Scott are a definite asset to the book. The chapters on the morphology, anatomy and biology of Anatidae and on the history, sport, conservation, care and breeding of this group, and the extensive bibliography which were originally planned for Vol. III were of such a bulk and entailed "so much work and take such a large space, that it is preferable to plan for them a fourth volume." This volume will also contain additions and corrections for the previous ones.

Dillon, Olan W., Jr. (SCS, Rosenberg, Texas.) FOOD HABITS OF WILD MALLARD DUCKS IN THREE LOUISIANA PARISHES. Trans. 24th N. Am. Wildl. Conf. p. 374-382. 1959.
Winter food habits studies of 231 mallard ducks collected from period 1954-8. Almost 90% of the food material in 106 gullets showed usage of rice or plants associated with rice culture. The change in food habits over previous studies indicates more use of agricultural lands by mallards. Recent census reports show approximately 90% of the mallard populations in this part of La. wintering in or near the rice growing area. The management techniques developed for making crop residues, weed seeds and cultivated duck foods such as browntop millet are discussed and their contribution to duck nutrition. The high value of rice field crop for mallard duck food is demonstrated and the need for agricultural land management as well as for the management and preservation of marshes is indicated.--From auth. abst.

Eygenraam, J. A. THE SEX-RATIO AND THE PRODUCTION OF THE MALLARD, ANAS PLATYRHYNCHOS L. Ardea 45(3/4): 117-143. (1957.) [From notice by O. L. Austin, Jr. in Bird-Banding 30(4), 1959.]
With Dutch summary. In the breeding population of Netherlands mallards, the sex ratio varies throughout the year. In Jan., prior to breeding season, it is 106 ♂♂ : 100 ♀♀. The excess of ♂♂ over ♀♀ in young at hatching is considerably higher, but is reduced by selective hunting to 114 : 100 in Nov. The nesting population is 300,000 mallards (est.) of which 145,000 are ♀♀, each of which rears an av. of 5 ducklings, giving an annual production of about 725,000.

Friley, Charles E., Jr. (Mich. Dept. Cons., Allegan, Mich.) CONTROLLED GOOSE SHOOTING AT MICHIGAN'S SWAN CREEK HIGHBANKS. Trans. 24th N. Am. Wildl. Conf. p. 245-260, 1 fig. 1959.

Canada goose shooting on a publicly-owned area in sw. Mich. is available without charge on a "first come, first served" daily-permit basis. Five years of harvest and hunting pressure data, from 1953 to 1957, are summarized. Nearly 53,000 permits were issued to an annually increasing group of hunters who shot 6,618 Canada geese, 22 Hutchins geese, and 14 blue and snow geese. Evolution of the hunter control system is traced and current control procedures are described. Annual statistics and average daily harvests are presented as are daily and periodic hunting pressures. Suggestions for future management of the land and the hunters are made.--From auth. abst.

Friley, Charles E., Jr. (Mich. Dept. Cons., Allegan.) THE CANADA GEESE OF MICHIGAN'S SWAN CREEK HIGHBANKS, 1953-1957. J. Wildl. Mgt. 24(1): 97-99, 1 fig. Jan. 1960.

Weights, sex, and age were determined from 6,618 Canada geese harvested at this research and managed hunting area. Av. weight was 7.97 pounds. Weights are given for sex and age groups. Sex ratio in the harvest was equal. Age ratios varied widely from year to year. Neither sex nor age appeared to influence weight increases during the fall. Migration dates, fall and spring peak populations, and winter population data are given.--Auth. abst.

Frith, H. J. (C.S.I.R.O., Canberra, Australia.) THE ECOLOGY OF WILD DUCKS IN INLAND NEW SOUTH WALES. I. WATERFOWL HABITATS. C.S.I.R.O. Wildl. Res. 4 (2): 97-107, 1 fig., 4 pls. Dec. 1959.

From summ. It is shown that the extent and distribution of the principal waterfowl habitats in New South Wales may vary widely from year to year, apparently necessitating great adaptability in many spp. of wild ducks.

Frith, H. J. (C.S.I.R.O., Canberra, Australia.) THE ECOLOGY OF WILD DUCKS IN INLAND NEW SOUTH WALES. II. MOVEMENTS. C.S.I.R.O. Wildl. Res. 4(2): 108-130, 4 figs., 1 pl. Dec. 1959.

The ecological significance of the different mobility patterns for Australian ducks during a period of drought is discussed.

Frith, H. J. (C.S.I.R.O., Canberra, Australia.) THE ECOLOGY OF WILD DUCKS IN INLAND NEW SOUTH WALES. III. FOOD HABITS. C.S.I.R.O. Wildl. Res. 4(2): 131-155, 6 figs. Dec. 1959.

The food habits of the 6 most common and economically important Australian ducks are discussed and compared.

Frith, H. J. (C.S.I.R.O., Canberra, Australia.) THE ECOLOGY OF WILD DUCKS IN INLAND NEW SOUTH WALES. IV. BREEDING. C.S.I.R.O. Wildl. Res. 4(2): 156-181, 4 figs., 1 pl. Dec. 1959.

"It is concluded that, although environmental factors are of prime importance in regulating sexual activity in wild ducks, the influence of fixed annual factors (including long-term photoperiodism) on some species cannot be entirely ignored." Based upon studies of 3 species of Australian ducks during 1952-7.

Keith, Lloyd Burrows. A STUDY OF WATERFOWL ECOLOGY ON SMALL IMPOUNDMENTS IN SOUTHEASTERN ALBERTA. Ph.D. thesis, U. Wis. 264 p. 1959. [Long abst. in Dissertation Abst. 20(3), 1959.]

Keith, Lloyd B., and Robert P. Stanislawski. (U. Wis., Madison.) STOMACH CONTENTS AND WEIGHTS OF SOME FLIGHTLESS ADULT PINTAILS. J. Wildl. Mgt. 24(1): 95-96, 1 fig. Jan. 1960.

Food habit studies of 122 flightless adult pintails taken in July from Pel Lake, Sask. Alkali bulrush (Scirpus paludosus), sago pondweed (Potamogeton pectinatus) and hardstem bulrush (Scirpus acutus) were the chief good species, comprising 32.4, 14.5 and 9.5 percent by volume, respectively, of stomach contents. Grit volume averaged 1.31 ± 0.07 ml per gizzard. The mean live weight of 69 adult ♂♂ was 31.4 ± 0.5 oz.; 116 other adult ♂♂ weighed 30.1 ± 0.5 oz. and 7 adult ♀♀ ± 1.4 oz., 40-55 hr. post mortem.--From auth. abst.

Kimble, Robert B., and Allen Ensminger. (La. Wild Life & Fisheries Comm., New Orleans.) DUCK FOOD HABITS IN SOUTHWESTERN LOUISIANA MARSHES FOLLOWING A HURRICANE. J. Wildl. Mgt. 23(4): 453-455. Oct. 1959.

A severe hurricane hit the sw. La. coast in July 1957 causing temporary disastrous flooding of the marsh where both studies were made. The immediate value of much of the marsh was greatly reduced for waterfowl since many food producing plants were scoured out by debris and currents. Since flooding occurred during the height of the growing season, some plants were completely eliminated, seed production was impaired on others, but certain aquatic plants increased. The comparison of the results of a food habits study of waterfowl before with one after the hurricane indicates a great difference in the foods eaten by ducks. Some foods found to be important in one study were of minor importance in the other study. Some benefit to waterfowl was attained as a result of the hurricane opening up landing and feeding areas in dense stands of vegetation.--From authors' abst.

Lebret, T. DE DAGELIJKSE VERPLAATSINGEN TUSSEN DAGVERBLIJF EN NACHTELIJK VOEDSELGEBIED BIJ SMIENTEN, ANAS PENELOPE L., IN EINIGE TERREINEN IN HET LAGE MIDDEN VAN FRIESLAND. [THE DAILY TRANSFER BETWEEN DAYLIGHT RESTING PLACES AND NOCTURNAL FEEDING GROUNDS OF WIDGEON, ANAS PENELOPE L., IN THE PROVINCE OF FRIESLAND.] Ardea 47(3/4): 199-210. 1959.

In Dutch with English summ.

Lemieux, Louis. (Min. du Nord Canadien et des Res. Natl., Quebec.) HISTOIRE NATURELLE ET AMENAGEMENT DE LA GRANDE OIE BLANCHE, CHEN HYPERBOREA ATLANTICA. [NATURAL HISTORY AND MANAGEMENT OF THE GREATER SNOW GOOSE, CHEN HYPERBOREA ATLANTICA.] Naturaliste Canadien 86(8/9): 133-192. 1959. [From Biol. Abst. 35(1).]

A comprehensive study of the distribution, nesting habitat (Ile Bylot), date of arrival, nest building, number of eggs laid (2-9), incubation period, moulting, food preferences, population numbers, predators of, and effect of hunting upon the greater snow goose. Included is a technique for banding. Of 777 banded, 69 were recovered. The paper terminates with a study of the density of Scirpus rhizomes which are the food of the birds at the resting areas along the St. Lawrence River. The density of this plant seems to be a potential limiting factor of population size.--G. R. Bernard.

Mörzer Bruijns, M. F. (R.I.V.O.N., Bilthoven, Netherlands.) PLEISTERPLAATSEN VAN WILDE GANZEN IN NEDERLAND. [FEEDING GROUNDS OF WILD GEESE IN THE NETHERLANDS.] De Levende Natuur 61: 121-126, 7 figs. 1958.

In Dutch. Major winter feeding grounds of wild geese in the Netherlands are mapped. Concern is voiced regarding the fate of these areas following imminent changes in land use. Individual accounts on geese (brant, barnacle, grey lag, white-fronted, bean and pink-footed) are included.

Nelson, Urban C., and Henry A. Hansen. (US F&WS, Juneau, Alaska.) THE CACKLING GOOSE -- ITS MIGRATION AND MANAGEMENT. Trans. 24th N. Am. Wildl. Conf. p. 174-187, 2 figs. 1959.

Taxonomic confusion clarified by nesting, migration and wintering ground studies. Cackling goose population essentially a "flock." The 481 band returns from 3,730 cacklers banded reveal a restricted migration route. From the breeding grounds on the outer delta between the Yukon and Kuskokwim Rivers, across the Alaska peninsula and the Pacific Ocean, the cacklers fly up the Columbia River to the east side of the Cascades, thence to the Klamath Basin and the Sacramento and San Joaquin Valleys. About 75% of the bands are returned from the latter three areas. Rate of band return was 14% from 1949 through 1954 compared to 38% in 1924. Av. mortality rate for 9 years was 46%. Population estimate 250,000-300,000. Nesting densities of 62 nests per sq. mi. and gregarious nature of bird dictate the necessity for the protection of breeding grounds.--H. A. Hansen.

Rogers, John P. (U. Mo., Columbia.) LOW WATER AND LESSER SCAUP REPRODUCTION NEAR ERICKSON, MANITOBA. Trans. 24th N. Am. Wildl. Conf. p. 216-224. 1959.

The study was made in 1957-8 in the pothole country of sw. Manitoba. The record high water levels of 1956 and 1957 declined steadily during this period and scaup production decreased 85% to 98% in 1958. Decreased water levels were associated with increased nest predation as the important factors in lowered production. In a 1958 bag check at Delta, Manitoba, 4,765 ducks were examined, including 1,759 scaup. The ratio of young per adult female in scaup, redhead, canvasback and mallard was the lowest on record at Delta.--Auth. abst.

Rosen, Merton N., and Raymond A. Bankowski. (Calif. Dept. Fish & Game, Sacramento.) A DIAGNOSTIC TECHNIQUE AND TREATMENT FOR LEAD POISONING IN SWANS. Calif. Fish & Game 46(1): 81-90, 2 figs. Jan. 1960.

Intravenous inoculations of the chelating agent calcium versenate were used successfully in the diagnosis and treatment of lead poisoning in swans.

Ryder, Ronald A. (Colo. State U., Ft. Collins.) COOT-WATERFOWL RELATIONS ON SOME NORTHERN UTAH MARSHES. Proc. Utah Acad. Sci., Arts & Letters 34: 65-68. 1957.

Presents results of the first year of a two-year study reported in Ryder, 1958 (see next review).--Auth. abst.

Ryder, Ronald A. (Colo. State U., Ft. Collins.) COOT-WATERFOWL RELATIONSHIPS IN NORTHERN UTAH. Ph.D. thesis, Utah State U. 219 p. 1958.

A 2-year study conducted in 1956-7, on and around Ogden Bay Refuge, Utah, to obtain data regarding the effects of coots upon duck production. Coots were reduced by killing adults and destroying nests on 2 areas. Attempts were made to increase coots on a third area by introduction, and 2 areas were left untreated as controls. Data were presented concerning comparative coot and duck breeding behavior, nesting and young-rearing success. Based upon nest observations, duck production per unit-area was not appreciably greater on treated areas (coots reduced) than on untreated areas. However, there was greater use by duck broods of the area on which coot hatching was reduced by nest destruction. Mortality, hunting importance, migration, and food habits of coots and ducks were discussed. It was concluded that coot-duck populations can be managed to achieve the maximum production of the desired species largely by habitat manipulation rather than by actual control of coots by hunting regulations, nest destruction, or other artificial methods.--Auth. abst.

U. S. Fish & Wildlife Service. THE WATERFOWL COUNCILS / A CONSERVATION PARTNERSHIP. USDI Circ. 78. 10 p., illus. 1959.

Describes the organization and functions of the 4 Flyway Councils and the National Waterfowl Council.

Weller, Milton W., and Peter Ward. (Iowa State U., Ames.) MIGRATION AND MORTALITY OF HAND-REARED REDHEADS (AYTHYA AMERICANA). J. Wildl. Mgt. 23(4): 427-433, 5 figs. Oct. 1959.

A comparison of the migration and mortality of wild-trapped and hand-reared redheads showed that both groups followed similar flight lanes but hand-reared birds migrated later and suffered a slightly higher mortality than did wild birds. Hand-reared birds were released in S. Dak. and Mich. in an attempt to increase populations. No significant increase was noted although trapping showed that ?? returned to S. Dak. the spring following release.--From authors' abst.

Wolny, P. THE INFLUENCE OF FLOCKS OF DUCKS ON BIOCENOSE OF CARP PONDS. Biul. Zakła Du Biologii Stawów Pan (Krakow) 3: 47-67, 10 figs. 1956. [From Polish Bibliog. Selected Ecol. Problems for II half 1956, Inst. Ecol., U. Warsaw.]

In Polish with Russian and German summ.

CRANES, RAILS, SHOREBIRDS

Bunni, Munir Kiriacose. THE KILLDEER, CHARADRIUS V. VOCIFERUS LINNAEUS, IN THE BREEDING SEASON: ECOLOGY, BEHAVIOR, AND THE DEVELOPMENT OF HOMOIOTHERMISM. Ph.D. thesis, U. Mich. 366 p. 1959.
Long abstract in Dissertation Abst. 20(5), 1959.

Goethe, Friedrich. (Vogelwarte Helgoland, Wilhelmshaven, W. Germany.) DIE WESTLICHE HERINGSMÖWE ALS BRUTVOGEL AUF MEMMERT UND ANDEREN DEUTSCHEN INSELN. [THE LESSER BLACK-BACKED GULL AS A BREEDING BIRD ON MEMMERT AND OTHER GERMAN ISLANDS.] Beiträge zur Naturkunde Niedersachsens 10(3): 49-60, 6 figs. 1957.
In German. Records the increases of Larus fuscus graellsii on Memmert Island since 1927 with information on life history (nesting, voice, and social organization).

Goethe, Friedrich. (Vogelwarte Helgoland, Wilhelmshaven, West Germany.) DAS HERABSTAAREN, EINE ÜBERSPRUNG BEWEGUNG BEI DEN LARIDEN. [STARING-DOWN, AN OVER-LOOKED MOVEMENT OF THE LARIDAE.] Behaviour 11(4): 310-317, 1 fig. + 1 pl. 1957.
In German with English and German summ. In Laridae, Limicolae and perhaps other birds, the characteristic movements of "staring-down" occurs but has not so far received much attention. It is often shown in conflict situations. It is argued that it may be the formalized part of displacement pecking and/or of displacement preening; it often introduces more complete forms of these movements or alternates with them. It could not be proved to function as a signal.--From summ.

Grosskopf, Gerhard. ZUR BIOLOGIE DES ROTSCHEWKELS (TRINGA T. TOTANUS) I. [ON THE BIOLOGY OF THE REDSHANK (TRINGA T. TOTANUS) I.] J. f. Ornith. 99(1): 1-17, 4 figs. 1958.
In German. Life history studies of the redshank [sandpiper] in Helgoland. Emphasis is on breeding cycle and the development of young.

Koridon, J. A. F. HET KLEINST WATERHOEN (PORZANA PUSILLA) BROEDVOGEL VAN NATUURRESERVAAT "HET ZWARTE MEER". [BAILLON'S CRAKE (PORZANA PUSILLA) BREEDING BIRD FROM THE "ZWARTE MEER" RESERVE.] Limosa 32(3): 117-121, 3 figs. 1959.
In Dutch. Nesting studies on this European rail with notes on voice.

Ryder, Ronald A. (Colo. State U., Fort Collins.) INTERSPECIFIC INTOLERANCE OF THE AMERICAN COOT IN UTAH. Auk 76(4): 424-442, 1 pl. Oct. 1959.
The coot actively defends an area centered about its nest against ducks and other vertebrates, as well as against other coots. In all, 11 spp. of ducks, 16 other spp. of birds, one fish, one reptile, and 2 mammals were seen pursued or threatened by coots. In Utah, cinnamon teal, redheads and ruddy ducks were attacked out of proportion to their abundance, whereas mallards were attacked less frequently.--Auth. summ.

Timmermann, A., and M. F. Mörzer Bruijns. (Mörzer Bruijns: R.I.V.O.N., Bilthoven, Netherlands.) HET BROEDSEIZOEN VAN DE KIEVIT, VANELLUS VANELLUS, IN 1957. [THE BREEDING SEASON OF THE LAPWING, VANELLUS VANELLUS, IN 1957.] Ardea 47(1/2): 87-98, 2 figs. 1959.
In Dutch with English summ. In spite of the early breeding season and the taking of many eggs for sale, 1957 was a successful season for lapwings. This is in accordance with earlier studies which proved that lapwings are able to breed successfully even after having lost 4 complete consecutive clutches.

OTHER BIRDS

Jones, Harry G. (Upper Darby Sr. High Sch., Pa.) A SALT MARSH NESTING STUDY. Proc. Pa. Sci. 33: 38-45. 1959. [From Biol. Abst. 35(3).]
A study of a 25-acre tract on the Bombay Hook Natl. Wildlife Refuge, Smyrna, Delaware. Locations of 59 nests representing 8 bird species were mapped. Occupied nests were distributed at random. Red-winged blackbirds showed a tendency to nest in areas containing open water. Dominant nesting species were red-winged blackbirds and long and short-billed marsh wrens. Some need for predator control was believed to be indicated. Burning of marsh should be done with discretion.--From auth. abst.

Kilham, Lawrence. (7815 Aberdeen Rd., Bethesda 14, Md.) EARLY REPRODUCTIVE BEHAVIOR OF FLICKERS. Wilson Bul. 71(4): 323-336, 3 figs. Dec. 1959.

Mörzer Bruijns, M. F. (R.I.V.O.N., Bilthoven, Netherlands.) EEN HAVIKAREND, HIERAËTUS FASCIATUS (VIEILLOT) IN NEDERLAND DOOD GEVONDEN. [A BONNELLI'S EAGLE IN THE NETHERLANDS.] Limosa 32(3): 107-110, 3 figs. 1959.
In Dutch with English summ. A new record for the Netherlands. Breeding range and records in w. Europe outside the breeding range are discussed and mapped.

Rodriquez-Vidal, Jose A. (Puerto Rico Dept. Agr., San Juan.) PUERTO RICAN PARROT (AMAZONA VITTATA VITTATA) STUDY. Puerto Rico Dept. Agr. & Commerce, Monog. no. 1. 15 p., 5 figs. Sept. 1959.
Results of a P-R study conducted during 1953-6. This endemic species is in danger of extinction--an estimated 200 remain. Principal predator is the Alexandrine rat; nesting sites were found only in hollows of old colorado trees Cyrilla racemiflora. The fruit of the sierra palm is preferred food of the 54 species of trees and vines utilized and during the rainy season (Aug.-Nov.) the fruit of Dacryodes excelsa is very important. Management recommendations include rat poisoning program and protection of old colorado trees.

Vleugel, D. A. (A. de Haenstraat 53, The Hague, Netherlands.) ON THE TEMPORAL PATTERN OF NOCTURNAL MIGRATION IN THRUSHES. Auk 77(1): 10-18. Jan. 1960.
An attempt to explain the apparently contradictory results obtained from the flight-call counting method and the silhouette-on-the-moon counting methods of observing nocturnal migrations.

REPTILES AND AMPHIBIANS

Gans, Carl. (Dept. Biol., U. Buffalo, Buffalo 14, N. Y.) STUDIES ON AMPHISBAENIDS (AMPHISBAENIA, REPTILIA). 1. A TAXONOMIC REVISION OF THE TROGONOPHINAE, AND A FUNCTIONAL INTERPRETATION OF THE AMPHISBAENID ADAPTIVE PATTERN. Am. Mus. Nat. Hist., Bul. 119(3): 129-204, 32 figs., 1 pl. May 1960. $1.50, paper, from Am. Mus. Nat. Hist., N. Y. 24, N. Y.
Includes much information on biology of our worm lizard, Rhineura floridana: locomotion, functional analysis of digging movements, orientation and food recognition, food and water intake, protection of the body and its orifices. This study of living Rhineura was conducted to throw light on adaptations, especially fossorial adaptations, of other amphisbaenids. The bulk of the paper is a basic study of the anatomy and taxonomy of an Afro-Arabian group of the family.--W. H. Stickel.

Gould, Edwin. (Tulane U., New Orleans, La.) STUDIES ON THE ORIENTATION OF TURTLES. Copeia 1959(2): 174-176, 1 fig. July 1959.
From summ. Eight painted turtles and 7 box turtles selected for their ability to orient homeward were released in unfamiliar territory and under clear skies from 3-5 different homeward directions and at distances ranging from 2.78 to 0.1 miles from home. For box turtles -- 26 out of 44 headings and for painted turtles -- 40 out of 58 headings were within 30 degrees of the homeward bearing. These data support the hypothesis that turtles can orient from new and different homeward directions when taken into unfamiliar territory.

Khalaf, Kamel T. (Baghdad, Iraq.) REPTILES OF IRAQ WITH SOME NOTES ON THE AMPHIBIANS. Ar-Rabitta Press, Baghdad. iii-v + 96 p., illus. May 1959. Price $1.50.
A systematic work dealing mainly with the lizards and snakes of Iraq; however, it includes an appendix on amphibians and turtles reported from Iraq.--Kenneth L. Williams.

Maslin, T. Paul. (U. Colo., Boulder.) AN ANNOTATED CHECK LIST OF THE AMPHIBIANS AND REPTILES OF COLORADO. U. Colo. Studies, Ser. in Biol. no. 6. vi + 98 p. Nov. 1959. Price $3.00.
The last previous checklist for Colo. was published in 1913 and 1915. In this present checklist, 77 spp. and ssp. are recognized. Annotations consist of location and number of type specimen, type locality, range in Colo., reference to original description, citation of papers and a listing of U. Colo. Museum specimens.

Morris, Percy A. (Peabody Mus. Nat. Hist., New Haven, Conn.) BOY'S BOOK OF TURTLES AND LIZARDS. Ronald Press Co., N. Y. 10, N. Y. vi + 229 p., illus. 1959. Price $4.50. [From Biol. Abst. 35(5).]
This is an interesting and informative book for beginning and amateur naturalists of any age. The turtles and lizards of the U. S. are described and other pertinent facts about their known range, habits, diet, and individual natural histories are presented in an entertaining style.--From abst. by M. C. Reddin.

Viosca, Percy, Jr. (La. Wild Life & Fisheries Comm., New Orleans 16.) SALAMANDERS IN LOUISIANA. La. Cons. 12(1): 8-9, 15-16, 4 figs. Jan. 1960.
La. has 18 spp. of salamanders.

FISHES

Cook, Fannye A. FRESHWATER FISHES IN MISSISSIPPI. Miss. Game & Fish Comm. 239 p., 41 figs. 1959. $3.00, paper.
This bulletin deals primarily with the identification, distribution, habits, and relative importance of the species of freshwater fishes in Miss. Descriptive figures of the different families and structural drawings, identification keys and a glossary supplement the lists and accounts of the species.

INVERTEBRATES

Christophers, Sir S. Rickard. AËDES AEGYPTI (L.) THE YELLOW FEVER MOSQUITO / ITS LIFE HISTORY, BIONOMICS AND STRUCTURE. Cambridge U. Press (London N.W. 1 and N. Y. 22). xii + 739 p., 86 figs. 1960. $14.50.
This book contains an unbelievable amount of information on one insect. Aëdes aegypti has significance to wildlife since it is not only a vector of sylvan yellow fever in monkeys but also of equine encephalitis in birds and other animals, haemorrhagic septicaemia in Asiatic buffaloes, myxomatosis in rabbits and malaria in birds as well as numerous diseases in man and domestic animals. The author gives an up-to-date and generally full account of what is known of this mosquito including chapters on the history of man's research on it, its systematics, bionomics, medical relationships, rearing techniques, feeding, mating, flight, behavior and control, and a number of chapters on its various life stages. Complete lists of literature references are presented with each chapter.--P. F. Springer.

Mörzer Bruijns, M. F., C. O. Van Regteren Altena, and L. J. M. Butot. (R.I.V.O.N., Bilthoven, Netherlands.) THE NETHERLANDS AS AN ENVIRONMENT FOR LAND MOLLUSCA. NEDERLAND ALS MILEU VOOR LANDSLAAKEN. Basteria 23 (suppl.): 132-174, 6 figs. July 1959.
Bilingual: English (pages 132-162) and Dutch (pages 163-174). Eighty-seven or more species of land molluscs of the 140 nw. European species are found in the Netherlands. There are sections on climate, edaphic factors,

biotic communities, vertical distribution of terrestrial molluscs. Surveys are being made of habitats of species which are rare in order to know which localities are of special scientific interest and deserve protection, e.g., as nature reserves.

Shuttlesworth, Dorothy. THE STORY OF SPIDERS. Illus. by Su Zan Noguchi Swain. Garden City Books (Garden City, N. Y.). 57 p. 1959. $2.95.

An excellent introduction to spiders for children--authoritative and well-written with remarkable colored illustrations illuminating each page. This large (8-1/2" x 11-1/4") attractive book encompasses many good features of book composition which are so often lacking in books designed for popular reading. The text has been checked for accuracy by Dr. Willis J. Gertsch of the Am. Mus. Nat. Hist.; a reference as to scale is included for each drawing of the spiders; native rather than exotic species are described, including representatives of both Eastern and West Coast forms; and an index and a brief bibliography are included. The book begins with a general discussion which dispells many of the myths and misconceptions associated with these "mysterious and misunderstood" creatures. Next their relationship to other invertebrates is indicated. Other chapters deal with spider silk, webs, life history and general habits. The remaining half of the book is devoted to a survey of various kinds of spiders one may encounter even in his own backyard. The economic importance of spiders is mentioned on the first page--"man-made insecticides present many problems because they poison animal life other than the intended victims. Therefore we should be deeply appreciative of our spider allies, which perform this service with no ill effects whatever to ourselves" [or other wildlife].

MASTER'S THESES IN WILDLIFE

Many master's theses were included in the two issues of Wildlife Review (nos. 59 and 63) which were devoted to theses for the period 1934-50. Since then, master's theses have been listed only as they came to our attention. Coverage by Wildlife Review of pertinent doctoral theses is routine through the aid of Dissertation Abstracts and from abstracts received from other sources. There is no regular abstracting service available for master's theses.

Osborn, Yoder and West recently compiled a list of forestry theses for the period 1956-8 (see WR 97: 14). Master's theses related to the ecology and management of wildlife were selected from this list for this issue of Wildlife Review, and abstracts have been supplied by the departments where the work was done. Also included are abstracts of more recent theses.

We gratefully acknowledge the help received for this compilation. We know that many "wildlife" theses have been neglected by Wildlife Review and we urge everyone to supply us with citations or abstracts of theses which we have missed and to help keep us up-to-date with this segment of the wildlife literature.

CONSERVATION EDUCATION

Hunter, William F. A STUDY OF CONSERVATION EDUCATION IN THE CEDAR LAKE AND MILL LAKE GROUP CAMPS. M.S. thesis, U. Mich. 54 p. 1957.

A study of 91 activity periods of 4 outdoor school camps revealed that only 34 had 60% or more of their material concentrated on nature study and science and about 20 periods had 60% or more orientated toward the study of conservation practices. Increases in the conservation and nature study program and long term projects are recommended for these camps.--From abst. by Warren W. Chase.

Ward, Charles Lyman. WILDLIFE EDUCATIONAL INFORMATION DESIRED BY COLORADO SPORTSMEN FROM STATE GAME MANAGERS. M.S. thesis, Colo. State U. 184 p., 17 figs. 1957.

Experts in game management have increasingly concluded that public education is a major need, but one that is exceedingly difficult to obtain. The study was conducted by use of questionnaires to determine what information was desired by Colo. sportsmen in regard to the big and upland game and which could be compiled in a single publication. It was the purpose of the study to aid in supplying Colo. sportsmen with information that might lead to a better understanding of wildlife and wildlife management.--From abst. by Lee E. Yeager.

WILDLIFE--TECHNIQUES

Brown, Gordon Howard. AN EVALUATION OF THE ALDOUS BROWSE MEASUREMENT SYSTEM AND ITS APPLICATION TO THE MOUNTAINOUS AREAS OF VIRGINIA. M.S. thesis, Va. Poly. Inst. 65 p., 5 figs. Aug. 1956.

Analysis of variance techniques were applied to 3 studies involving operators with various degrees of experience in the use of the Aldous method. Significant differences, when they did occur, can be explained by the inexperience of the operators in applying the system. A familiarity with (1) the normal forms of the different plant species, and (2) a standardized frame of reference resulting from continued practice with the Aldous method will enable operators to obtain data which are both consistent and comparable. The standard recording technique of the Aldous method is to be preferred over any attempted refinements. It allows a more rapid sampling to be done and adequately records both the availability and use of the plants.--Auth. summ.

Gehling, Raymond L., Jr. EVALUATION OF ABANDONED FIELDS FROM AERIAL PHOTOGRAPHS AS COTTONTAIL RABBIT HABITAT. M.S. thesis, U. Mass. 1959.

Aerial photographs with stereoscopic coverage at 6 different scales were studied to discover which scale was most suitable for recognition of vegetative features in abandoned fields which comprise good cottontail rabbit habitat. The scale of 1:7920 was sufficiently large to reveal all details recognizable in larger scale photographs. A smaller scale obscured some important vegetative types. As part of the study, 200 stereograms of vegetational types on abandoned fields and forest edges were made up for reference of other wildlife biologists evaluating game habitat from aerial photographs.--W. G. Sheldon.

Park, Edwin C. (P. O. Box 887, Bend, Oreg.) THE USE OF THE SET CAMERA AS A TECHNIQUE IN WILDLIFE PHOTOGRAPHY. M.S. thesis, Oreg. State Coll. 87 p., 14 photos. June 1959.

A two-year study was conducted to investigate the uses of the set camera in obtaining wildlife photographs. The various types of cameras, light sources, triggering devices, baits and lures, and methods of concealment and protection of equipment were studied. A set camera can be used to best advantage in obtaining photographs of nocturnal animals, in recording very rapid motion, or in other cases where it would be difficult to obtain the desired photographs by any other method.--Author.

Porter, Kenneth A. EFFECTS OF SUBALPINE TIMBER CUTTING ON WILDLIFE IN COLORADO. M.S. thesis, Colo. State U. 92 p., 12 figs. 1959.

Mule deer, snowshoe hare, and dusky grouse populations were measured by pellet count and forage production by weight-estimate on clear-cut areas of spruce-fir and lodgepole pine forest on the Fraser Experimental Forest, Colo. Clear-cut strip widths of one, two, three, and six chains cut in 1954-6; cuttings in 1946-50, 1944, and 1940; and uncut control areas were measured. Arnica cordifolia production was stimulated by clear-cutting, especially in wider strip widths, but other vegetative production remained essentially constant. Numbers of deer and snowshoe hare pellets increased with time since cutting. More deer, snowshoe hare, and dusky grouse pellets were found in uncut controls one-half to one and one-half miles away than in any clear-cut areas. Pellet numbers were unrelated to strip width.--H. W. Steinhoff.

WILDLIFE--TECHNIQUES--Continued

Radtke, Robert E. SOME ENGINEERING TECHNIQUES USED IN WILDLIFE MANAGEMENT. M.S. thesis, U. Mich. 108 p. 1958.
In addition to the design, construction, and operation of engineering structures useful in wildlife management, there are sections on soils, concrete, and blasting.--From abst. supplied by Warren W. Chase.

FARMLAND & WILDLIFE

Crowther, C. E. AN EVALUATION OF GAME RANGE ON THREE LOESS HILL FARMS IN YAZOO COUNTY, MISSISSIPPI. M.S. thesis, La. State U. 72 p. 1950.
A critical evaluation of the habitat for gray and fox squirrels, bobwhite quail, and cottontail and swamp rabbits. Management recommendations are based on deficiencies in game range as indicated by the evaluation.--Leslie L. Glasgow.

RANGELAND & WILDLIFE

Martinsen, Charles F. THE EFFECTS OF SUMMER UTILIZATION OF BITTERBRUSH IN NORTHCENTRAL WASHINGTON. M.S. thesis, U. Idaho. 69 p., 22 figs. 1959.--Paul D. Dalke.

Medin, Dean E. PHYSICAL SITE FACTORS INFLUENCING ANNUAL PRODUCTION OF MOUNTAIN MAHOGANY IN NORTHWESTERN COLORADO. M.S. thesis, Colo. State U. 108 p., 16 figs. 1959.
Designed to determine the role of physical site factors as they influence the annual production of true mountain mahogany (Cercocarpus montanus) on a localized area in nw. Colo. Joint observations on mahogany stands and site factors were made on 125 sample plots. Parent material, soil depth, soil texture, and surface stoniness contributed significantly to the variation in annual production. Soil nutrients, soil reaction, slope gradient, exposure, and water infiltration rate contributed only very weakly.--From auth. abst.

FORESTLAND--FORESTRY & ECOLOGY

Bailey, James A. THE UTILIZATION OF CLOSED CONIFER PLANTATIONS BY WILDLIFE. M.S. thesis, Syracuse U. 107 p., 4 figs. 1958.
A summer study was made of the birds and mammals in a large closed conifer plantation in cent. N. Y. The 256 acre plantation contained mostly red pine, white pine, and Norway spruce in combination with white pine. Observation and trapping studies gave an indication of the distribution of some wildlife species along line transects within and around the plantation. Data were collected on 25 species of birds and 15 species of mammals. The information concerning the ruffed grouse, blackcapped chickadee, eastern robin, black-throated green warbler, towhee, red squirrel, eastern chipmunk, deer mice, and voles are especially significant, and are discussed in detail. Suggestions for managing conifer plantations as wildlife habitat through manipulation of the size, shape, variability, and accessibility of the stand, and through special silvicultural and wildlife management practices are given.--From long abst.

STRIPPED LAND & MISCELLANEOUS HABITATS

Foster, Charles H. W. 2nd. WILDLIFE USE OF UTILITY RIGHTS-OF-WAY IN MICHIGAN. M.S. thesis, U. Mich. 103 p. 1956.
Statistics reveal close to three-quarters of a million acres in utility rights-of-way in Mich. alone. Investigations indicated that wildlife was not only using the strips, but using them more than the surrounding tracts of woodland. Rights-of-way proved most beneficial to wildlife where the most abrupt vegetation change took place. Recommendations: Where low-growing cover is already present on either side of the proposed right-of-way, practices should encourage an open form of strip either in grass or low herbaceous vegetation; where surrounding conditions are open, maximum wildlife benefit will normally be derived from a strip of low growing vegetation which will provide food, cover, and a protected travel lane for species utilizing the area.--From abst. supplied by Warren W. Chase.

Brown, Ellsworth Reade. THE USE OF SODIUM TCA AND DALAPON TO CONTROL THE COMPETITION OF PERENNIAL GRASSES WITH BITTERBRUSH SEEDLINGS. M.S. thesis, U. Idaho. 113 p., 19 figs. 1958.--Paul D. Dalke.

Heuschkel, Dexter Gouldin. TESTS OF SOME CHEMICAL HERBICIDES IN CONTROLLING BRUSH, WEED TREES, AND GRASSES ON THE McDONALD FOREST. M.S. thesis, Oreg. State Coll. 1956.

Results of tests of a variety of the newer herbicidal products on 37 plant species. Grasses were best controlled by a mixture of brushkiller and Chloro IPC. Douglas-fir seedlings were planted several months after the grasses had been sprayed. In all cases, seedling mortality was higher on sprayed plots than on unsprayed plots. The only major species of woody plants for which no controls were found were snowberry and thimbleberry. By number of species controlled, foliage and basal sprays were nearly equal in effectiveness. The best results by number of species controlled were given by basal sprays of BEP, 2,4,5-T and Du Pont brushkiller and by foliage sprays of the Ortho and BEP brushkillers.--From abst.

Jones, Hobart Bowen. PROGRESS IN CHEMICAL CONTROL OF CERTAIN WEED TREES, SHRUBS AND GRASSES ON FOREST LANDS OF WESTERN OREGON. M.S. thesis, Oreg. State Coll. 1958.

Study concerned with chemical control of Oregon white oak, vine maple and bigleaf maple.

Oregon white oak - Summer applications in axe frills of Silvex in diesel oil produced complete kills of oaks up to 13" d.b.h. by the third year after application. Late summer applications of brush killer and 2,4,5-T showed promise but kill decreased as the d.b.h. increased.

Vine maple - Aerial spraying at bud bursting time with Kuron or Esteron 245 at concentration of 1 gal. chemical to 9 gal. diesel oil per acre was effective.

Bigleaf maple - Under 9" d.b.h.: Effective control by basal applications of 2,4,5-T, 2(2,4,5-TP) and brush killer herbicides. Silvex applied to axe frills also effective. Over 9" d.b.h.: Basal treatments of 5% Kuron and late summer treatments of 5 and 10% Kilbrush both gave impressive early results.--From long abst.

Yawney, Harry Wolodymyr. EFFECTS OF VOLUME OF FOLIAGE SPRAY CONTAINING 2,4-D AND 2,4,5-T ON WOODY BRUSH IN CENTRAL PENNSYLVANIA. M.S. thesis, Pa. State U. 105 p. 1957.

A study of the effect of different volumes of selective stem-foliage spray on mixed oak-maple brush and on ground cover on a power line right-of-way in cent. Pa. A 1:1 mixture of the butoxyethanol esters of 2,4-D and 2,4,5-T mixed at the rate of 1 gal. of the mixture to 99 gal. of water. Treatment classes of 100, 200, 300 and 400 gal. per acre were used. No essential differences in the excellent top kill achieved by the 200, 300 and 400 gal. treatments after one growing season. The 100 gal. treatment was found to be significantly poorer than each of the other three treatments and was considered unsatisfactory. It was estimated that twenty, forty, sixty-five and seventy percent of the ground cover was killed by the 100, 200, 300 and 400 gal. treatments respectively. Abundance determinations of ground cover species were made before spraying and one year after spraying. Although 20% of the ground cover was killed by the 100 gal. treatments, an increase of 5% in the vegetation was noted over that which had existed on the plots before spraying. The cover value on the 200 gal. plots had increased due to the expanding population of the more resistant species and the presence of new invaders. The damage on the 300 and 400 gal. plots was so severe that one growing season did not allow the more resistant species and invaders to revegetate the areas to the extent existing before spraying.--From summ. supplied by Ward Sharp.

MAMMALS--GENERAL

De Coste, John H. THE RELATIONSHIP OF MAMMALS TO SUCCESSION ON THE TULLY FOREST. M.S. thesis, Syracuse U. 101 p., 14 figs. 1959.

An apparent relationship was observed between the plant communities and the species and number of mammals in each stage. The number of individuals that were captured increased from the early to the late successional stages. The deer mouse and the short-tailed shrew were virtually cosmopolitan in their distribution. The meadow jumping mouse was confined to the early open stages while the woodland jumping mouse was found only in the stages in which woody vegetation was present as were the red-backed vole and sciurids.--From abst.

RABBITS AND PIKAS

Boyle, John D. AN EVALUATION OF STOCKING NEW BRUNSWICK HARE (LEPUS AMERICANUS) IN MASSACHUSETTS MIXED FOREST HABITAT. M.S. thesis, U. Mass. 1955.

By live-trapping in four tracts of snowshoe hare habitat in cent. Mass., data were gathered which indicated that the stocking of wild-trapped hare in cover already supporting a native hare population netted no increase. In cover suitable for hare but unoccupied, the N. B. hares are sufficiently wild and adaptable to establish a population.--From abst. by W. G. Sheldon.

Hensler, Robert G. A SURVEY OF PARASITES FROM THE VISCERAL TRACTS OF THE COTTONTAIL RABBIT, SYLVILAGUS FLORIDANUS MEARNSII, IN SOUTHERN MICHIGAN. M.S. thesis, U. Mich. 57 p. 1959.

All of a sample of 100 cottontail rabbits were found to be infected with one or more species of internal parasites, helminth and coccidia. Ninty-nine per cent were infected with helminth parasites and 51% were infected with coccidia. Four species of intestinal coccidia were found in addition to one trematode, three cestodes, and five nematodes. Eimeria steidae was recovered from the contents of the gall bladder of two rabbits, a probable first report for this host. Juvenile and adult rabbits showed little difference in susceptibility to the various species of parasites, except Trichostrongylus which was more prevalent and found in greater numbers in juvenile rabbits.--From abst. supplied by Warren W. Chase.

RODENTS

Brunett, Louis E. SQUIRREL POPULATIONS IN RELATION TO FOREST TYPES IN ZEMURRAY'S PARK, TANGIPAHOA PARISH, LOUISIANA. M.S. thesis, La. State U. 112 p. 1957.

Hardwood bottomlands supported the highest population of gray squirrels; longleaf pine with scattered hardwood flats was preferred by fox squirrels; pure loblolly stands contained few squirrels. Squirrel foods were determined on a seasonal basis.--Leslie L. Glasgow.

Chabreck, R. H. A STUDY OF BEAVER IN ST. TAMMANY PARISH, LOUISIANA. M.S. thesis, La. State U. 105 p. 1957.

This study was conducted 18 years after beaver were released in the parish. Describes habitat and ecology with emphasis on foods and forest relationships. Contains a good discussion of the economic importance of beaver in the parish. --Leslie L. Glasgow.

Noble, R. E. THE SURVIVAL, ADAPTATION, DISTRIBUTION AND ECOLOGY OF TRANSPLANTED BEAVER CASTOR CANADENSIS IN LOUISIANA. M.S. thesis, La. State U. 215 p. 1958.

An extensive beaver live trapping and transplanting program was very successful. The author discusses in detail the advisability of the continuation of the program and concludes that in many instances the beaver is an undesirable animal. He recommends against further transplanting.--Leslie L. Glasgow.

Olsen, Peter F. SOME ASPECTS OF THE ECOLOGY OF THE MUSKRAT, ONDATRA ZIBETHICUS (LINN.), AT DELTA, MANITOBA. M.S. thesis, U. Mich. 163 p. 1957.
A two-year study of muskrats at Delta, Manitoba, disclosed that the distribution and abundance of food plants was an important factor governing the size of the muskrat winter population. Considerable information is also presented on breeding. Peaks of litter production occurred at four-week intervals starting with a synchronized initial breeding period. A factor of 7.5 muskrats per dwelling house was most appropriate for estimating muskrat populations from house counts. The two factors most adversely effecting the population were the high and fluctuating water levels and an epizootic of the hemorrhagic disease. Predators were not significant in depressing the population. [See WR 95: 52, and WR 96: 45 for published material from this thesis.] --From abst. supplied by Warren W. Chase.

BIG GAME, GENERAL

Beeman, Robert D. SALT IN THE MANAGEMENT OF ELK AND OTHER WILDLIFE IN THE LOWER SELWAY RIVER AREA. M.S. thesis, U. Idaho. 113 p., 20 figs. 1957.--Paul D. Dalke.

Bentley, Wallace. THE RANGE RELATIONSHIPS OF ROOSEVELT ELK (CERVUS CANADENSIS ROOSEVELTI, MERRIAM), AT PRAIRIE CREEK REDWOODS STATE PARK, HUMBOLDT COUNTY, CALIFORNIA, IN 1958. M.S. thesis, Humboldt State Coll. xv + 82 p., 7 figs. 1959.
A continuation of the study of Harn (1958). This is an investigation of the elk range as it affects the population. Information on vegetative condition, soils, food habits. The pellet group count as a census technique was also investigated. It was found that the rate of pellet group decomposition was so great during wet weather that a conversion factor based on rate of deposition alone would be useless.--C. F. Yocom.

Boll, Louis Arthur. ELK NUTRITION--THE RESPONSE OF ELK CALVES TO VARIOUS WINTER DIETS UNDER CONTROLLED CONDITIONS. M.S. thesis, Mont. State U. 99 p. 1958.
This study was conducted at the Blackfoot-Clearwater Big Game Range during the winters of 1957-8 to determine the forage requirements, measure the effects of different diets on growth and survival, and to determine the forage preferences of elk calves for various forage species during the winter. The experimental diets fed during the two winters of the study consisted of native bunchgrass (Agropyron spicatum) and (Festuca scabrella), willow, serviceberry, lodgepole pine, and Douglas fir in various combinations and amounts. Meadow hay was fed as a control diet. Calves fed the control diet consumed more food per 100 pounds of body weight and lost the least percentage of body weight than calves fed native forages; however, calves fed diets including deciduous browse did very well throughout the study periods. Bunchgrass and conifer diets produced poor results, but it was concluded that if consumption is maintained, the calves would be able to survive the winter on low quality forages. Elk calf preference for certain types of feed during the winter was measured by three methods. During both years meadow hay was the most preferred forage offered to the calves. Bunchgrass was the next preferred food. Calf preference for the deciduous browse species varied between years. Forages were analyzed chemically and the apparent digestibilities of each diet were calculated by means of the lignin-ratio method. It was concluded that the key winter forage for elk on native ranges is deciduous browse and the ability of elk calves to successfully survive the critical winter months is dependent on the availability of this class of forage.--From long abst.

Courtright, Alan M. RANGE MANAGEMENT AND THE GENUS RANGIFER: A REVIEW OF SELECTED LITERATURE. M.S. thesis, U. Alaska. xii + 172 p. 1959.
From abst. A review of the present status of knowledge concerning the food and food habits of reindeer and caribou. Thesis consists of 1) a general review of the subject, 2) selected abstracts of pertinent writings, and 3) numerical and other tabulated data. Rangifer is of a nomadic disposition and the food supply seems to be the most likely key to nomadism. According to the

literature, no plants (with the exception of lichens) serving as foods for Rangifer are deficient in any essential nutrients. Lichens have not proved to be essential in the diet, but instead appear to be a "preferred" food item, and their exact role in northern range ecology remains to be determined.

Drury, Herbert R. NATURAL HISTORY, CONSERVATION, AND ECOLOGY OF THE MUSK OX. M.S. thesis, U. Mich. 74 p. 1955.
Based upon a literature review with observations of the author in Canada during the summers of 1952-4. A review of the natural history of musk ox is presented. Earlier this species was exploited, but under protection it is making a graiual recovery. The adaptability of musk oxen to variable environments plus their assets of high grade wool and excellent meat may provide future industries for northern lands. However, there is need for further investigation of their natural history and ecology as a basis for any sustained-yield type of management program.--From abst. by Warren W. Chase.

Folker, Robert V. A PRELIMINARY STUDY OF AN ANTELOPE HERD IN OWYHEE COUNTY, IDAHO. M.S. thesis, U. Idaho. 102 p., illus. 1956.--Paul D. Dalke.

Geis, Anthony F. THE FOOD CONSUMPTION AND RELATIVE DIGESTIBILITY OF VARIOUS WINTER DIETS FED TO ELK (CERVUS CANADENSIS NELSONI) UNDER CONTROLLED CONDITIONS. M.S. thesis, Mont. State U. vi + 68 p. 1954.
Native forage plants found on winter game ranges in w. Mont. were used as basic elk diets in the study. The diets consisted of cured native bunchgrass, meadow hay, and native browse plants and combination diets were formulated from the 3 basic diets. The elk and cattle were fed an unrestricted amount of food. An adequate daily feed allowance for cow elk appears to be approximately 2.2 pounds of air dry forage per 100 pounds of live weight. A 500 pound cow elk should then consume 11 pounds of air dry forage per day under winter conditions. The forage requirement per cwt. for cattle was very similar to that of adult cow elk. Elk calves have a higher forage requirement per cwt. than adult cow elk or cattle.--From long abst.

Greichus, Algirdas. SPECIES AND INCIDENCE OF HELMINTH PARASITES FOUND IN THE WILD AND DOMESTIC RUMINANTS OF IDAHO AND THEIR POSSIBLE TRANSMISSION FROM WILD TO THE DOMESTIC RUMINANTS. M.S. thesis, U. Idaho. 41 p., 5 figs. 1957. --Paul D. Dalke.

Harn, Joseph H. THE ROOSEVELT ELK, CERVUS CANADENSIS ROOSEVELTI (MERRIAM), AT PRAIRIE CREEK REDWOODS STATE PARK, HUMBOLDT COUNTY, CALIFORNIA. M.S. thesis, Humboldt State Coll. 93 p., 13 figs., 15 tables. 1958.
This paper covers a two-year study of the ecology, social behavior, distribution and abundance of Roosevelt Elk in Humboldt and Del Norte Counties, California. Movements, natality, mortality, feeding habits and distribution are all covered in this study.--C. F. Yocom.

Helwig, Lawrence L. THE VALUE OF CONIFERS AS A WINTER FEED FOR ELK (CERVUS CANADENSIS NELSONI) DETERMINED UNDER CONTROLLED CONDITIONS. M.S. thesis, Mont. State U. 79 p. 1957.
A controlled feeding study was conducted in sw. Mont. evaluating Douglas fir and lodgepole pine as winter feed for elk. Most of the feeding trials were run for 37 days on adult ♀ elk trapped in Yellowstone National Park. Nine diets were tested. They consisted of: (1) all meadow hay; (2) varying amounts of meadow hay (based on a maintenance requirement) plus conifers; (3) two diets consisting of only Douglas fir and only lodgepole pine; and (4) one diet of willow and serviceberry. The animals on the mixed meadow hay-conifer diets responded quite well to their feed, but those animals on the single conifer diets lost as much as 23% of their initial weight. Following the conifer feeding trials, the animals were provided all the feeds used in the study on a free-choice basis. Meadow hay was eaten in much larger proportions than any of the browse species. The heavy use of conifers and the high loss in body weight apparently did not result in death of the animals or adversely effect their ability to produce calves. In general these animals can cope with some very adverse food conditions and still maintain a high level of calving success.--From long abst.

Kindel, Frederic J. SALT IN THE MANAGEMENT OF ELK IN THE LOWER SELWAY RIVER DRAINAGE, IDAHO. M.S. thesis, U. Idaho. 115 p., 24 figs. 1958.--Paul D. Dalke.

Rausch, Robert A. SOME ASPECTS OF POPULATION DYNAMICS OF THE RAILBELT MOOSE POPULATIONS, ALASKA. M.S. thesis, U. Alaska. ix + 81 p. 1959.
From abst. Male moose reach sexual maturity at 16-18 months; ?? usually at 28-30 months. Rut extends from Sept. through early Nov., with a peak in early Oct. All moose (over 2 yrs. old) examined in the two years of study were fertile. Ninety-four percent of Age Class II and older ?? were pregnant. Sex and age data on 476 moose are presented. Sex ratios of fetuses and calves indicate a 1:1 sex ratio. Age structure of 3 local populations differs--possibly due to environment. Calf mortality of 30-70% by Oct. or Nov. may be normal for the populations studied. Weights and measurements of 83 moose are presented.

Robel, Robert Joseph. SALT AS A MANAGEMENT TOOL AND MIGRATION STUDIES ON ELK IN THE LOWER SELWAY DRAINAGE OF IDAHO. M.S. thesis, U. Idaho. 107 p., 33 figs. 1958.--Paul D. Dalke.

DEER (Odocoileus)

Adler, Max Eugene. WINTER FOODS OF THE WHITE-TAILED DEER ON THE EDWIN S. GEORGE RESERVE. M.S. thesis, U. Mich. 73 p. 1959.
An analysis of the stomach contents of 44 deer taken during the early winter periods of 1957-8 and 1958-9 was made. A total of 44 plant spp. were identified from parts present. In the 35 stomachs collected in 1957-8, acorns were the most important item, with sumac fruits second. In 1958-9 sample of 9 stomachs, sumac fruits were most important, with acorns a poor second.--From abst. supplied by Warren W. Chase.

Crawford, Hewlette S. A STUDY OF SOME FACTORS IN THE FAWNING COMPLEX OF THE WHITE-TAILED DEER. M.S. thesis, U. Mich. 67 p. 1957.
Past and present data concerning the reproduction of a fenced herd of white-tailed deer is discussed. Methods of stalking, identifying, capturing, and tagging individuals were developed. For capturing and tagging fawns, a small group (2-5 individuals) was believed to be the most adequate. The ratio of fawns per producing doe was calculated to be approximately 1.5 : 1. It was estimated that a minimum of approximately 50% of all fawn does produced young. Fawn mortality was apparently insignificant.--Abst. supplied by Warren W. Chase.

McConnell, Burt R. A PRODUCTIVITY STUDY OF MULE DEER ON THE CASSIA DIVISION OF THE SAWTOOTH NATIONAL FOREST. M.S. thesis, U. Idaho. 75 p., 2 figs. 1957. --Paul D. Dalke.

Meagher, Margaret Mary. A COMPARATIVE DEER BROWSE AND HERD DENSITY STUDY, 1949-1958, ON THE GEORGE RESERVE. M.S. thesis, U. Mich. 60 p. 1958.
In an enclosed deer range recovering from a heavily overbrowsed condition, there has been a shift of browse usage from less desirable to more palatable species. Important browse species are black cherry, red and black oak, smooth sumac, gray and red osier dogwood, poison sumac, and willow. A herd of approximately 25 deer per section, the present population, can be maintained without range damage and will allow natural succession to proceed.--From abst.

Menzel, Karl E. SEASONAL AND ANNUAL CHANGES IN WEIGHTS OF GEORGE RESERVE DEER. M.S. thesis, U. Mich. 45 p. 1958.
Fully dressed, hog-dressed, and whole weights were taken on deer during an 18-year period. The relationships of hog-dressed and whole weight varied for several periods of observation. For a constant whole weight, deer in good condition have a greater hog-dressed weight than those in poor condition. The same results were found for fully dressed deer. It is therefore impossible to convert accurately from one type of weight to another when data to be compared are collected during different years or from different habitats. On a seasonal basis, winter weight loss is greater in bucks than does, and older deer lose a greater proportion of weight than younger ones. Weight fluctuations are greater in deer in good condition than in those in poor condition.--From abst. supplied by Warren W. Chase.

Mustard, Eldie W., Jr. BROWSE DIFFERENCES IN EXPERIMENTAL PASTURES UNDER CONTROLLED STOCKING WITH CATTLE, SHEEP, AND MULE DEER IN NORTHWEST COLORADO. M.S. thesis, Colo. State U. 105 p., 14 figs. 1958.

Calibration measurements of browse at the Little Hills Game Experiment Station, where nine pastures are maintained by the Colo. Game & Fish Dept., were made. The pastures are stocked with cattle, sheep, deer, and combinations of these species, at stocking intensities designated as light, moderate, and heavy. The study area is in the piñon-juniper region. Sheep showed the greatest effect on browse deterioration, cattle the least, and deer were intermediate.--From abst. by Lee E. Yeager.

Ryan, Paul W. A METHOD FOR DETERMINATION OF DEER MOVEMENT PATTERNS. M.S. thesis, Syracuse U. 72 p., 14 figs. 1957.

A technique for marking deer so that information on cruising radius, type preference, periods of maximum and minimum activity and other movement information may be obtained without the necessity of direct observation is presented. The deer is marked by means of a miniature radio transmitter. The position of the deer is obtained by recording two simultaneous bearings on the transmitter signal with directional receivers. Schematics of the transmitter and receiver are included along with some discussion of their operation. Transmitters using a single tube, which will operate 60-70 hours, can be built for approximately fifteen dollars. Incorporation of transistors and solar batteries into the transmitting apparatus to reduce the size and increase operating life is discussed. Field procedure for employing the technique is discussed along with precautions necessary to avoid certain errors.--From abst. supplied by William L. Webb.

Sheffield, William J. A SUMMER DEER FOOD STUDY IN TENSAS PARISH, LOUISIANA. M.S. thesis, La. State U. 1957.

A modified Aldous browse survey was used to determine the herbaceous and woody plants eaten by deer in ne. La.--Leslie L. Glasgow.

Swanson, Donald O. A STUDY OF THE HELMINTH PARASITES OF THE GEORGE RESERVE DEER HERD. M.S. thesis, U. Mich. 44 p. 1959.

In a two-year study, 53 deer were examined for helminth parasites. Six species of parasites were found; one trematode, one cestode, and four nematodes. In order of occurrence the species found were: Leptostrongylus alpenae, Oesophagostomum venulosum, Nematodirus filicollis, Zygocotyle lunata, Trichuris ovis, and Moniezia expansa. Incidence of intestinal worms was higher in fawns than in adults, and higher in ♂♂ than in ♀♀; incidence of lungworms (Leptostrongylus) was higher in ♂♂ than ♀♀ and about equal for fawns and adults. A possible new host record is recorded for the trematode Zygocotyle lunata.--Abst.

Uptegraft, Darrell D. THE ECOLOGY AND DEER CARRYING CAPACITY OF THE HOWLAND ISLAND GAME MANAGEMENT AREA. M.S. thesis, Syracuse U. 92 p., 27 figs. 1959.

An investigation of the deer population, its development, seasonal distribution, and harvests. It was concluded that the deer population had developed through the interaction of high immigration, protection, excellent range, and a high reproductive rate. There was no winter yarding on the Island, although there was a tendency for concentration areas to exist. Hunters' success (archers) depends upon the weather and the concentration of hunters. Results indicate that approximately 200 archers per square mile of huntable range are desirable. A new browse-analysis method was developed for the determining of the carrying capacity. The number of twigs per stratum per acre of certain browse species was determined. This twig count was converted to pounds per acre by the use of species weight constants. The results indicated that 125 deer could be maintained on the area for a 60-day winter snow period. For a 90-day winter snow period this figure would be 82 deer.--From abst.

BIRDS--QUAIL

Clawson, Sterling Gene. EFFECTS ON BOBWHITE QUAIL, COLINUS VIRGINIANUS (LINNAEUS), OF AN AERIAL APPLICATION OF HEPTACHLOR AND DIELDRIN. M.S. thesis, Ala. Poly. Inst. xii + 50 p., 8 figs. Aug. 22, 1959.
See WR 95: 12 for a review of a technical report based on this thesis.

GROUSE

Kupa, John Joseph. RUFFED GROUSE, BONASA UMBELLUS UMBELLUS (LINNE.), STUDIES IN CENTRAL MASSACHUSETTS (FOR PERIOD 1956-1958). M.S. thesis, U. Mass. 1958.
Second of 2 studies which were identical in nature and served to complete a long-term 10-year study of 2 tracts of grouse habitat in cent. Mass. [See Werner below for thesis covering earlier period.] One area was not exposed to gun pressure and openings were growing up rapidly into woods. The second area was exposed to heavy gun pressure, but vegetative succession was arrested through land practices. It is indicated that vegetative succession rather than the gun is the limiting factor in grouse populations. Both studies also ran experiments of grouse drumming counts by car in habitats of different forest succession outside the study areas. There was close statistical correlation between grouse populations, forest succession and acreages of coniferous stands in early succession.--W. G. Sheldon.

Spaulding, Willard Morland. A SURVEY OF PARASITES OF THE RUFFED GROUSE (BONASA UMBELLUS) IN OTTAWA NATIONAL FOREST. M.S. thesis, U. Mich. 56 p. 1958.
Fifty-seven ruffed grouse were collected from the Ottawa Natl. For. in n. Mich. and examined for parasites. Leucocytozoan bonasae was the most important blood parasite found. Three species of trematodes, four cestodes, and several nematodes were found. Coccidiosis was present in 24% of the birds examined. No Pasteurella tularensis was isolated during the study.--From abst.

Werner, Jack W. RUFFED GROUSE, BONASA UMBELLUS UMBELLUS (LINNE.), STUDIES IN CENTRAL MASSACHUSETTS (FOR PERIOD 1954-1956). M.S. thesis, U. Mass. 1958.
See Kupa above for abstract.--W. G. Sheldon.

DOVES AND PIGEONS

Peterson, David Wallace. A STUDY OF THE POPULATION DYNAMICS OF THE EASTERN MOURNING DOVE (ZENAIDURA MACROURA CAROLINENSIS) IN OCONEE COUNTY, GEORGIA. M.S. thesis, U. Ga. 47 p. 1957.
Three types of census routes were used in censusing of mourning doves in Oconee County, Ga. A twenty-mile call and road count was used in conjunction with a fifty-mile road count. The primary factor effecting the number of doves observed on a roadside count on two-directional routes was the time during the run of the route. There was no significant difference found between successive days, direction, or temperature during the period in which the two-directional routes were run. No statistical correlation could be established between the number of birds seen and the number of birds heard on the 20-mile call count. The shortcomings of the census methods used are indicated and suggestions for possible census methods for estimating mourning dove populations on a year-round basis are made.--From summ. supplied by James H. Jenkins.

WATERFOWL

Doering, Howard J. WATERFOWL NESTING IN CLAY COUNTY IN SOUTHEASTERN NEBRASKA. M.S. thesis, U. Mich. 85 p. 1959.
A study of 81 nests of mallards, blue-winged teals, pintails, and shovelers on a 8.5 section study area. Early and late cover types for nesting waterfowl were differentiated. Pintails and mallards were early nesting species; the blue-winged teal was a late nesting species. Only 13 of the 81 nests hatched successfully; mammalian predation destroyed 23, farming 31, and abandoned nests or unknown causes 14. The av. clutch of incubated nests of the 4 species was 9.0 eggs for the blue-winged teals and mallards, 10.0 for shovelers, and 7.2 for pintails. Inadequate nesting cover and an uncertain water supply were serious deterrents to duck production.--From abst. supplied by Warren W. Chase.

Lacy, Charles H. EVALUATION OF ARTIFICIAL POTHOLE AND LEVEL DITCH DEVELOPMENT AS A MEANS OF INCREASING WATERFOWL PRODUCTION ON WILDLIFE REFUGE. M.S. thesis, Utah State U. 103 p. 1959.--Jessop B. Low.

Lutz, Richard W. THE UTILIZATION AND PRODUCTION OF WATERFOWL FOODS AT THE ERIE MARSH, MONROE COUNTY, MICHIGAN. M.S. thesis, U. Mich. 120 p. 1960.
In 1958-9, 150 waterfowl digestive tracts were collected. These included 80 mallards, 31 black ducks, and 16 blue-winged teal. Utilization of food was analyzed by seasons. Production of four important food plants (curly-leaved pondweed, sago pondweed, nodding smartweed, and softstem bulrush) was studied. --From abst. supplied by Warren W. Chase.

Moore, Dwight D. ECOLOGICAL CHANGES AND WILDLIFE USE IN IMPOUNDED AREAS WITH EMPHASIS ON FLOODED FOREST SWAMPS. M.S. thesis, U. Mass. 1959.
Seven flooded forest areas of which the history was known were studied in se. Mass. with the main objective of evaluating these as waterfowl habitat. Wood ducks used large areas extensively as breeding areas, but black ducks used them mainly in the fall as resting areas. The most promising finding was the attraction to breeding black ducks of small recently flooded wooded areas where the vegetation had not been killed. Trees might well survive if the water were drawn down during the latter part of the growing season (when broods attain flying age).--From abst. by W. G. Sheldon.

Sherwood, Glen. THE WHISTLING SWAN IN THE GREAT SALT LAKE VALLEY OF UTAH. M.S. thesis, Utah State U. 79 p. 1959.--Jessop B. Low.

Town, Ralph Harry. A SURVEY OF HELMINTH PARASITES IN DIVING DUCKS FOUND DEAD ON THE LOWER DETROIT RIVER. M.S. thesis, U. Mich. 61 p. 1960.
During the winter 1958-9, 100 dead ducks (52 lesser scaups, 15 greater scaups, 22 canvasbacks, 8 common goldeneyes, and 3 common mergansers) were collected from the lower Detroit River. The sample was composed of 17 adults and 83 immatures; 60 ♂♂ and 40 ♀♀. The av. weights of the ducks were considerably less than normal. Ingested lead shot were found in 4 ducks; 26 had shot wounds of which only 3 were considered fatal. Helminth parasites were found in all of the ducks examined. Trematodes were found in 99 ducks; nematodes in 90; cestodes in 88; and acanthocephalids in 4. Twelve types of trematodes, 5 nematodes, 3 cestodes, and 3 acanthocephalids were identified.--From abst. supplied by Warren W. Chase.

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